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MELLINGER, BARRY L.	1972
MESSMAN, WARREN B.	1963
MILAN, THOMAS R.	1968
MILLER, LARRY R.	1971
MILLER, LARRY R.	1971
MILNOR, BRENT T.	1971

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AUTHOR	DATE
MONROE, ALLEN L.	1970
MORGAN, JIMMY B.	1969
MORRIS, ALLEN E.	1971
MORTIMER, WILLIAM E.	1956
MOSLEY, SAMUEL N.	1970
MUND, RICHARD G.	1970
MURPHY, JAMES O.	1972
NAGLE, ROLAND F.	19
NEASHAM, ERNEST R.	1968
NICHOLS JR, GEORGE V	1971
NICHOLS JR, GEORGE V	1971
NICHOLS, JACK D.	1970
NORRIS, MARSENA M.	1968
ODBERT, JOHN T.	1973
OLSON, RICHARD R.	1971
OPPELT, MARION O.	1967
OUTCALT, RICHARD M.	1971
PARKS, DARRELL L.	1968
PELLEGRIN JR, JOSEPH	1971
PERSHERN, FRANK R.	1967
PFAHL, ALVIN K.	1971
PFAHL, ALVIN K.	1970
PHILLIPS JR, MILTON	1967
POLOMSKY, JOHN V.	1969
POTTER, DENIS A.	1973
PRICHARD, NEAL W.	1962
PRUST, ZENAS A.	1964
RANDOLPH, JAMES R.	1972
REBHORN, ELDON A.	1972
REESER, GEORGE W.	1971
REESER, GEORGE W.	1971
RICE, DICK C.	1966
RIGGS, DONALD D.	1971
ROBERTS JR, LEWIS	1972
ROBERTS, EDWARD R.	1971
ROBINSON, WILLIAM D.	1971
RUSSELL, GENE H.	1970
SCHELLER, THOMAS G.	1967
SCHRAG, MARIE C.	1972
SEAMAN, DON F.	1968
SHEPARD, JON M.	1968
SHERCK, CHARLES P.	1969
SHIBLES, FOSTER M.	1971
SHULTZ, FRED A.	1971
SIEVERT, NORMAN W.	1971
SMITH, KAY H.	1962
SPRECHER, ROBERT F.	1970
STAMBOOLIAN JR, JOHN	1972
STANFIELD, FOSTER A.	1971
STANGER, NORMAN R.	1967
STEINGART, JACOB	1970
SUNDIN, ROBERT L.	1971
TATE, JOHN B.	1971
TOLLEY, CHARLES H.	1969
TRAMBLEY, JOHN B.	1969
TUTTLE, CHESTER D.	1965
UNDERHILL, CHARLES M	1968
WALDORF, ROBERT J.	1971
WALDORF, ROBERT J.	1971
WANGER, RUTH	1971
WARGO, WILLIAM D.	1968
WERTHEIM, JUDITH B.	1971
WIERSTEINER, SAMUEL	1970
WILLIS, GEORGE E.	1972
WINDHAM, BILLY L.	1972
WOODS, WILLIAM H.	1971
YOUNG, FRED O.	1971
ZULLINGER, JOHN	1966

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AUTHOR	DATE
BARROW, RICHARD W.	1969
CALHOUN, MARJORIE R.	1970
COMER, JOHN C.	1970
COMSTOCK, THOMAS W.	1969
DROST, JIM L.	1970
FINCH, CURTIS R.	1969
GRAY, JAMES A.	1969
GROTE, CHARLES N.	1960
HOBBS, ADDISON S.	1971
KAVIEFF, MELVIN C.	1961
KINKER, H. ROBERT	1949
MC LENNAND, BERNARD	1971
POUCHER, KENNETH S.	1968
RUDIGER, ELMER R.	1952
SHARMA, BALDEV R.	1967
SNOW, JOHN W.	1966
STEPHENSON, DONALD J	1970
STEPHENSON, DONALD J	1970
SWANSON, RICHARD A.	1968
WALKER, LLOYD R.	1946
WALLACE, NORMAN E.	1968
WOMACK, WILLIAM M.	1971
YUNG, JOHN E.	1965

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AUTHOR	DATE
BARON, ANDREW W.	1968
DENNISON, BOBBY	1970
DUTTON, BERNARD	1966
ELLIOTT, CHARLES A.	1958
ENTORF, JOHN F.	1967
EPPLER, THOMAS L.	1969
GLAZENER, EVERETT R.	1958
GRONEMAN, CHRIS	1950
HARMON, JAMES S.	1969
HESS, HARRY L.	1969
HICKMAN, KEITH F.	1967
HOERNER, JAMES L.	1969
JENKINS, JOHN D.	1969
JONES, GARY H.	1969
MC CAGE, RONALD D.	1970
NESTEL, GERALD E.	1970
NEWTON, ROBERT E.	1970
NYSTROM, DENNIS C.	1969
ROUTH, JERRY D.	1970
SMITH, EARL J.	1968
SUMTER, PAUL E.	1969
WRIGHT, OSCAR W.	1954
YOUNG, WILLIAM H.	1969

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AUTHOR	DATE
BARTEL, CARL R.	1959
BELL, CLAUDE A.	1964

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AUTHOR	DATE
BAKER, GLENN S.	1968
BATES, IVAN W.	1971
BRUSH JR, GEORGE W.	1969
FINLEY, LUTHER E.	1954
FLAHERTY, HUGH	1944
GRANDCHAMP, ROBERT J	1971
HENNIG, JAMES F.	1970
JULIAN, LESTER J.	1953
OTTERSON, PEDER A.	1969
PAWELEK, ALAN R.	1950
PHILLIPS, JOSEPH W.	1935
RECKERD, THOMAS E.	1970
RINCK, JOE A.	1968
SANDERS, LEROY J.	1967
SIMONS, ROBERT M.	1969
SPAULDING, ROLAND H.	1936
WHYBARK, DAVID C.	1967

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AUTHOR	DATE
BAGLEY, RONALD E.	1965
BENSON, KENNETH R.	1956
BIEDLER, JOHN S.	1958
BURDETTE JR, WALTER	1955
CANTOR, ROBERT L.	1952
CRAWFORD JR, BRYANT	1961
DANOVITZ, SAUL	1957
GARBEE, EUGENE E.	1949
GRONEMAN, CHRIS	1950
HAMPTON JR, ISAAC P.	1959
HUKILL, VIRON N.	1958
JACKSON, PETER A.	1965
KIMBALL, KENNETH R.	1967
LANDERS, FREDERICK W	1937
MARSHALL JR, THOMAS C	1941
MAYFIELD, WINIFRED A	1970
NELSON, LLOYD P.	1955
OSBURN, BURL N.	1939
PHILLIPS, KENNETH	1950
SHOEMAKER, CHARLES E	1961

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AUTHOR	DATE
ALDRICH III, DANIEL	1972
ANDERSON, ERNEST F.	1966
BARLOW, GENE A.	1971
BUNTEN, CHARLES A.	1955
CAGE, BOBBY N.	1968
FORBES, ROY H.	1970
FOWLER, HARMON R.	1970
GOISHI, FRANK H.	1970
GRAMBERG, MERLYN L.	1971
HICKMAN, KEITH F.	1967
JUANG, HWAI-I	1972
KOEHLER, MYRON	1972
MC NAMARA, JAMES F.	1970
PARRY, ERNEST B.	1968
PETERSEN, MOLEN L.	1971
ROBERTSON, LYLE R.	1968
SHYMONIAK, LEONARD R	1972
VANDER LINDE, ALBERT	1971

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AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
CREMER, KENNETH D.	1970
FORBES, ROY H.	1970
HARRIS, ROBERT C.	1970
HENNIG, JAMES F.	1970
JONES, CHARLES I.	1967
JURALEWICZ, RICHARD	1966
KRUPPA, RICHARD A.	1970
LARSON, CURTIS G.	1971
NEVITT, THOMAS A.	1966
NORRIS, MARSENA M.	1968
SCHWEINFURTH, LUDWIG	1969
STRICKLAND, THOMAS W	1959
TALKINGTON, JOE E.	1962
VESPER, KARL H.	1969

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AUTHOR	DATE
BRAME, WILLIAM E.	1967
CASSIMATIS, PETER J.	1967
GALLUP, LELLAND L.	1970
KAFFER, FRED C.	1941
NEUBAUER, GERHARDT W	1956

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AUTHOR	DATE
DYE, CHARLES M.	1971
HAMMER, GERALD K.	1962
HEJKAL, OTTO C.	1950
JOHNSTON, KENNETH G.	1966
LA BOUNTY JR, HUGH O	1961
MOODY, RICHARD D.	1968
TWOMBLY, ROBERT C.	1968
YARRINGTON, HOLLIS R	1970

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AUTHOR	DATE
BENJAMIN, NEAL B.	1969
BERGSTROM, PHILIP G.	1970
ENVICK, DONALD D.	1968
JARED, ALVA H.	1968
KAISER, HENRY	1968
KAPLAN, WILLIAM A.	1970
STOKES, VERNON L.	1971
WAITKUS, LORIN V.	1971

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AUTHOR	DATE
GROSS, ANDREW C.	1968
VAUGHN, MAURICE S.	1967

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AUTHOR	DATE
BRENNAN, THOMAS J.	1953
FRITZ, ROBERT C.	1960
PAULIN, HENRY S.	1964

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AUTHOR	DATE
BAILEY, DONALD A.	1970
BAILEY, DONALD A.	1970
BOAZ, HOLLAND E.	1965
BRENCKLE, AUTHUR G.	1968
BROWN, ROBERT D.	1955
CONLEY, FRANKLIN	1968
DARDEN, BYRNES L.	1951
DELZAR, CHRISTIAN L.	1972
EARHART, CECILIA R.	1946
JACKEY, DAVID F.	1933
JOHNSON, ELOUISE E.	1967
LAUDA, DONALD P.	1966
LUCY, JOHN H.	1971
MELLINGER, BARRY L.	1972
MELLINGER, BARRY L.	1972
ORR, RALPH O.	1970
PFAHL, ALVIN K.	1971
PFAHL, ALVIN K.	1970
PROCTOR, BERNARD S.	1950
SAYOVITZ, JOSEPH J.	1955
STANTON, WILLIAM A.	1967
STOUGH, KENNETH F.	1968
VAUGHN, MAURICE S.	1967
WALLACE, NORMAN E.	1968
WHYBARK, DAVID C.	1967
WRIGLEY, MARGARET	1968
ZANE, LAWRENCE F.	1968

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AUTHOR	DATE
BROWN, NATHAN	1954

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AUTHOR	DATE
BJORNERUD, JAMES A.	1970
BRIGGS, LLOYD D.	1971
BROWN, WALTER E.	1971
EDWARDS, JOHN T.	1970
ENVICK, ROBERT M.	1970
FRANTZ JR, NEVIN R.	1967
GALLUP, LELLAND L.	1970
GLEASON, WILLIAM E.	1967
GUNDERSON, ORLEY D.	1971
HALE, LESTER W.	1967
HANSBURG, HENRY	1935
HILL, EDWIN K.	1968
HULLE, WILLIAM A.	1972
JACKMAN, DUANE A.	1961
JOHNSON, ROBERT I.	1958
JOHNSON, WAYNE C.	1969
KEIL, RAYMOND L.	1966
LINDAHL, DONALD G.	1971
MANNING, GEORGE E.	1971
MANSFIELD, ROBERT T.	1959
MINELLI, ERNEST L.	1957
OUTCALT, RICHARD M.	1971
STEVENSON, JAMES E.	1953
STUTEVILLE, CLAUDE E	1971
THOMPSON, GUERN K.	1971
VANTRUMP, WILLIAM F.	1961
VOLK, VINCENT A.	1955
WALSH, JOHN P.	1958
WRIGHT, LAWRENCE S.	1954

CNST

AUTHOR	DATE
BEDNAR, ERNEST G.	1955
BENJAMIN, NEAL B.	1969
BERGSTROM, PHILIP G.	1970
BICKNELL, WILLIAM C.	1942
BOLLINGER, ELROY W.	1950
BOWERS, VICTOR L.	1941
BRAME, WILLIAM E.	1967
BROEMAER, GARY M.	1968
CASSIMATIS, PETER J.	1967
CASSIMATIS, PETER J.	1967
DUFFY, JOSEPH W.	1958
EATON, MERRILL T.	1932
ELLIS, NEIL G.	1966
FOSTER, HOWARD G.	1969
GALLUP, LELLAND L.	1970
GALLUP, LELLAND L.	1970
GLEASON, WILLIAM E.	1967
HAUENSTEIN, ALBERT D	1966
HAYNES, LUTHER J.	1956
JARED, ALVA H.	1968
JURALEWICZ, RICHARD	1966
KUWIK, PAUL D.	1970
LLOYD, CLIFFORD J.	1968
PETER, RICHARD F.	1970
REESER, GEORGE W.	1971
REESER, GEORGE W.	1971
THIEME, EBERHARD	1965
VANDEBERG, LOYD W.	1955
VANHERCK, DON V.	1966
WAITKUS, LORIN V.	1971
WEST, WILLIAM E.	1969
WHITE, DAVID L.	1973
YOUNG, DARIUS R.	1968

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AUTHOR	DATE
ALKAN, OMER C.	1969
ARNOLD, FRANK J.	1932
ARNOLD, WALTER M.	1957
BARROW, RICHARD W.	1969
BASKIN, SAMUEL	1954
BENJAMIN, GERALD E.	1968
BERGVIN, PAUL E.	1945
BILLINGS, DONN	1953
BLEDSOE, HARRY J.	1968
CHILSON, JOHN S.	1969
COOPER, JACK H.	1961
CRUNKILTON, JOHN R.	1969
DETRICK, RONALD L.	1972
DOBSON, CLIFFORD G.	1956
DRAKE JR, FRANCIS D.	1969
EDDY, EVAN M.	1956
FARAHBAKHSHIAN, EBRA	1967
GALLAGHER, JAMES E.	1970
GELINAS, PAUL J.	1954
GRAY, JAMES A.	1969
HALE, LESTER W.	1967
HAWLK, ROBERT H.	1960
HOLLOWAY, LEWIS D.	1967
HUBER, PAUL M.	1971
IVINS, WILSON H.	1947
JENSEN, THOMAS R.	1966
KOHRAM, GEORGE E.	1952
KU, GEORGE C.	1973
LUX, DONALD G.	1955
MALKAN, JEROME M.	1967
METERHENRY, WESLEY C	1946
MEISNER, ROBERT G.	1967
MICHELSON, EINO S.	1956
MILLER, CLARENCE M.	1968
MONROE, LYNNE C.	1939
O NEIL, IVOR R.	1972
RILEY, E. C.	1970
ROEDER, JOHN A.	1972
SANDERS, LESTER E.	1967
SAWYER, DAVID E.	1972
SCHENCK, JOHN P.	1969
SHERCK, CHARLES P.	1969
SHIBLER, HERMAN L.	1941
SHORE JR, THOMAS C.	1970
SILVEY, WRAY D.	1950
SMITH, FARMER S.	1969
STORY, CHARLES H.	1970
TUTTLE, CHESTER D.	1965
WATERSTREET, DONALD	1969
WELCH, FREDERICK G.	1971
WELCH, FREDERICK G.	1971

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AUTHOR	DATE
AXELROD, AARON	1951
BUXTON, ROBERT E.	1960
DAVIS, WARREN C.	1936
FEIRER, JOHN L.	1946
GOLD, CLARENCE H.	1967
GROSSEL, ROGER L.	1971
HENNIG, JAMES F.	1970
HOLT, JAY E.	1970
ILLINIK, ROBERT L.	1971
INGRAM, MAURICE D.	1971
INGRAM, MAURICE D.	1971
KAPLAN, HAROLD	1956
KAPLAN, WILLIAM A.	1970
KELLY, MICHAEL V.	1968
KING, THOMAS G.	1958
KLEIN, CHARLES T.	1942
LESTER, SEELIG L.	1944
MAHONEY, JAMES H.	1956
MC KENZIE, CHARLES R	1971
MONTELEONE, THOMAS I	1952
MUNGER, PAUL R.	1972
OLSEN, GEORGE A.	1971
ORLANDO, FRANK J.	1972
PAINE, HARRY W.	1943
POLETTE, DOUGLAS L.	1972
RUMMELL, WINFIELD R.	1971
SALMON, DANIEL A.	1965
SELLON, WILLIAM A.	1950
SILVIUS, HAROLD G.	1946
SPAULDING, ROLAND H.	1936
THOMAS, HENRY L.	1971
THORNTON, ROBERT W.	1971
TUTHILL, RUSSELL	1970
VOELKNER, ALVIN R.	1970
ZABCIK, CALVIN L.	1969

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AUTHOR	DATE
HAMPTON JR, ISAAC P.	1959
JANSEN, DUANE G.	1972
JASNOSZ, THOMAS A.	1969
KAFFER, FRED C.	1941
MILLER, JOHN R.	1970
WAINA, RICHARD B.	1969
ZIEL, HENRY R.	1961

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AUTHOR	DATE
BERGSTROM, PHILIP G.	1970

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AUTHOR	DATE
ADAMS, DEWEY A.	1966
ADAMS, ROBERT W.	1947
BLOCK, MURRAY H.	1953
FURLONG, JOHN	1957
SCHOLES, CHARLES E.	1968
SEAMAN, DON F.	1968
WILLIAMSON, MERRILL	1958
WREN, HAROLD A.	1941

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AUTHOR	DATE
ANDERSON, EDWARD C.	1970
BERGSTROM, HOWARD E.	1965
BOLICK, GERALD M.	1968
BORTZ, WALTER R.	1971
BOTTOMS, JAMES E.	1965
BOVENIZER, ELDRED R.	1968
BRADLEY, HARRY L.	1967
BRINKMAN, FRED J.	1970
CARPENTER, THOMAS E.	1971
CASNER, DANIEL	1950
CHILSON, JOHN S.	1969
CLEVELAND, JOHN M.	1961
CLIFTON, RONALD J.	1970
COMBS, STANLEY L.	1948
CORMACK, ROBERT B.	1970
D COSTA, AYRES G.	1968
DE BORD, ROBERT F.	1972
DODGE, ARTHUR F.	1935
DOERR, JOHN J.	1967
DRAKE, JAMES B.	1972
DUTT, KARL E.	1969
ELLIOTT, BURTON L.	1971
GALLOWAY, JOEL D.	1972
GARBEE, EUGENE E.	1949
GEARING, PHILLIP	1970
GILBREATH, TOMMY D.	1971
HATALSAN, JOHN W.	1963
HELBERG, DONALD H.	1969
HYDE, ELDON K.	1968
JOHNSON, DONALD H.	1966
KEIM, LAWRENCE	1966
KUETEMEYER, VINCENT	1972
LOOSLE, DARRELL K.	1967
MAC DONALD, MANLEY E	1944
MC CALLUM, HARRY N.	1967
MC CLURE, CLOIS A.	
MEIER, MARY A.	1969
MOSLEY, SAMUEL N.	1970
OMAN, RONALD N.	1971
PASSMORE, JAMES L.	1968
PLATA, MACIMINO	1971
POTTER, DENIS A.	1973
PRUSKI, JOHN	1958
PUGH, DWIGHT A.	1969
REAMS, JAKE W.	1963
RELYEA, GLADYS M.	1937
SAWYER, DAVID E.	1972
SCHELLER, THOMAS G.	1967
SHAW, GERALD H.	1968
SMITH, ROYAL E.	1969
SOLIMAN, ABDALLA M.	1967
SOLTYS, ROBERT G.	1971
STENSON, ORVIS J.	1971
STILLERMAN, MANUEL	1970
THORPE, CLAIBURNE B.	1968
THORPE, CLAIBURNE B.	1968
TICHENOR, HAROLD D.	1967
VAN DERSLICE, JOHN F	1967
WERNER, WAYNE E.	1969
WINDLE, JIM L.	1968
WITT, HENERY F.	1971
WOJCIK, JAMES A.	1971
WOOD, GRANT R.	1970
WYNNE, ROBERT L.	1968

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AUTHOR	DATE
ANDERSON, RICHARD B.	1970
BARBER, CARL S.	1967
BASS, RONALD E.	1971
BIEKERT, RUSSELL G.	1971
BRUNTLETT, JOHN E.	1973
CAMBELL, CLIFTON P.	1971
CAMPBELL, CLIFTON P.	1971
CASE, MERL E.	1971
DONADIO, BLASE	1969
GIERKE, EARL W.	1970
GROSSEL, ROGER L.	1971
GRUMBLING, HENRY M.	1968
HARDING, LARRY G.	1971
HILL, CLAIR S.	1971
HORNBUCKLE, GARY D.	1967
JORDAN, KENNETH F.	1969
KELLY, MICHAEL V.	1968
MEDEIROS, EDWARD J.	1970
NOVOSAD, JOHN P.	1971
PHILLIPS, THOMAS G.	1971
RANDOLPH, JAMES R.	1972
ROSSER, ARTHUR J.	1968
RUMMELL, WINFIELD R.	1971
UMSTATTD, WILLIAM D.	1970

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AUTHOR	DATE
BENSON, KENNETH R.	1956
GARBEE, EUGENE E.	1949
GLISMANN, LEONARD W.	1967
JOHNSON, IRA H.	1955
OSBURN, BURL N.	1939
RICH, MILDRED K.	1958
ROBBINS, EVELYN G.	1949
SEEHOFF, JESSE	1942
SOLIMAN, ABDEL RAZEK	1970
TRAPANESE, MENNA G.	1964
VANN, LOWELL C.	1970
ZANKOWICH, PAUL	1956
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
ABITIA, FREDDIE	1971
ACKER, JAMES D.	1971
ALGER JR, LEON J.	1967
ANDERSON, DONALD N.	1963
ANDERSON, HERBERT A.	1953
ARNOLD, JOSEPH P.	1965
BAKAMIS, WILLIAM A.	1951
BETTENCOURT, WILLIAM	1953
BICKNELL, WILLIAM C.	1942
BRANTNER, SEYMOUR T.	1962
BROOKER, GEORGE R.	1970
BUDKE, WESLEY E.	1970
CAMPBELL, CLIFTON P.	1971
CAMPION, HOWARD A.	1941
CARTER, JOHN P.	1970
CASE, MERL E.	1971
CAULEY, MICHAEL J.	
CHUANG, YING C.	1967
COATES, SUE S.	1971
COCHRAN, LESLIE H.	1968
COLEMAN, WAYNE D.	1967
CONNER, JOHN D.	1971

CRAWSHAW, MARSHALL R	1950
CREMER, KENNETH D.	1970
DAVIS, JIM L.	1966
DITLOW, GEORGE H.	1956
DOELLINGER, KEITH E.	1971
DYER, PALMER E.	1970
EISS, ALBERT F.	1954
ENGELBART, LEON P.	1970
EVANS, HARRY L.	1953
FARAHBAKHSHIAN, EBRA	1967
FARR, WILBUR J.	1958
FECIK, JOHN T.	1970
FINLEY, LUTHER E.	1954
FOSS, MAURICE F.	1958
GAUTHIER, MICHAEL K.	1972
GEHRING, GLEN S.	1969
GERBER, RUSSELL L.	1966
GLEASON, WILLIAM E.	1967
GOLD, CLARENCE H.	1967
GOLDBERG, JOEL	1971
GORDON, KENNITH G.	1971
GOSSAGE, LOYCE C.	1967
GRAHAM, GREGORY S.	1971
GRANNIS, GARY E.	1970
GRIESENBROCK JR, HER	1955
GROSSEL, ROGER L.	1971
HALFIN, HAROLD H.	1973
HENDRIX, WILLIAM F.	1967
HOPPER, CHARLES H.	1971
HULLE, WILLIAM A.	1972
HUNTER, ROBERT F.	1970
HUSUNG, WILLIAM T.	1970
INGRAM, MAURICE D.	1971
INGRAM, MAURICE D.	1971
JENKINS, JOSEPH R.	1971
JOHNSON, DOUGLAS H.	1969
JOHNSON, HARRY L.	1955
JOHNSON, IKA H.	1955
JOHNSON, ROBERT O.	1968
JULIAN, LESTER J.	1953
KAPLAN, WILLIAM A.	1970
KAVANAUGH, WILLIAM A	1955
KETCHAM, GEORGE W.	1963
KLEIMAN, HERBERT S.	1966
LARSON, DELMAR L.	1964
LEVENSON, WILLIAM B.	1937
LINTON, JOHN A.	1951
LLOYD, CLIFFORD J.	1968
LOATS, HENRY A.	1950
LONDON, HOYT H.	1934
LUX, DONALD G.	1955
MANNION, EDMUND J.	1972
MARTIN, WALDO D.	1970
MATTHEWS JR, PAUL J.	1972
MAW, JAMES L.	1971
MEYER, HARVEY K.	1951
MOREHEAD, JAMES C.	1971
MORRILL, DAVID	1970
MUNGER, PAUL R.	1972
MYERS, ROY E.	1971
NOVOSAD, JOHN P.	1971
OLIVER, GEORGE L.	1970
ORLANDO, FRANK J.	1972
OXLEY, VINCENT E.	1969
PAINE, HARRY W.	1943
PATE JR, DOVE H.	1970
PHARES, GAIL J.	1962
POLETTE, DOUGLAS L.	1972
POWER, ANDREW T.	1955
RELYEA, GLADYS M.	1937
ROEDER, JOHN A.	1972
ROSS, B. JOHN	1971
ROSSER, ARTHUR J.	1968
ROWNTREE, URWIN	1951
RUSSELL, SAMUEL E.	1966
SANDBERG, NINA M.	1968
SCHMITT, MARSHALL L.	1953
SEIGLER, CLAUDE I.	1970
SHIGETOMI, SAMSON S.	1970
SNITZ, RUBEN H.	1931
SORENSEN, RONALD L.	1964
SPAZIANI, RICHARD L.	1972
SPRANKLE, NORMAN H.	1971
STADT, RONALD W.	1962
STERN, JACOB	1964
STRANDBERG, C. E.	1963
STRONG, MERLE E.	1958
TAYLOR JR, HOUSTON	1968
THOMAS, HENRY L.	1971
THORNTON, ROBERT W.	1971
TUTHILL, RUSSELL	1970
VOELKNER, ALVIN R.	1970
WAITKUS, LORIN V.	1971
WAITKUS, LORIN V.	1971
WAKITA, OSAMU A.	1970
WALSTON, HARRY W.	1970
WEALE, MARY J.	1968
WEATHERS, RICHARD D.	1972
WENIG, ROBERT E.	1970
WENTZ, CHARLES H.	1969
WILMOTT, JOHN N.	1941
WINTERS, KENNETH W.	1970
WITHERSPOON, EVERETT	1971
WOLANSKY, WILLIAM D.	1968
ZABCIK, CALVIN L.	1969
ZAREISN, SOLEIMAN	1969
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
CORMACK, ROBERT B.	1970
CUONY, EDWARD R.	1953
HARRISON, DENIST D.	1972
KEPLER, ATLEE C.	1968
KO, JIIN-RONG	1972
O NEIL, IVOR R.	1972
POTTER, DENIS A.	1973
TOSH, DONALD J.	1971
WHATLEY, ALICE E.	1967

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AUTHOR	DATE
ADELMAN, FRANK W.	1972
BOYER, CAROLINE K.	1966
BURGETT, DONALD C.	1970
COBURN, JAMES M.	1969
CRAIG JR, WILLIAM L.	1970
ENGELBART, LEON P.	1970
GREGG, MURRY C.	1972
GRONEMAN, CHRIS	1950
HARRIS, RICHARD	1970
HILL, JOSHUA	1972
HUNTER, ROBERT F.	1970
INABA, LAWRENCE A.	1970
LAND, MING H.	1971
LEAVITT, MURRAY P.	1970
MARSHALL, CHARLES R.	1971
MC NAMARA, JAMES F.	1970
MEIER, MARY A.	1969
MUDZO, MICHAEL G.	1970
NEEDHAM, RAYMOND J.	1969
O NEILL, JOHN N.	1971
OGUNNIYI, OMOTOSHO	1969
OLSON, HERBERT A.	1970
RAPP, ALFRED V.	1972
SCHWEINFURTH, LUDWIG	1969
SEARS JR, WOODROW H.	1971
SMITH, KENNETH T.	1972
TOBIN, GERALD W.	1972
UXER, JOHN G.	1967
VANDER LINDE, ALBERT	1971
WELSH, BARTON W.	1971
WIGGS, GARLAND D.	1971

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AUTHOR	DATE
ABROMAITIS, JOSEPH J	1969
ANDERSON, DONALD N.	1963
BABCOCK, JAMES G.	1969
BARLOW, GARY C.	1967
BATES, WILLIAM M.	1969
CANTOR, ROBERT L.	1952
CLAY, KENNETH R.	1965
COLLONS, RODGER D.	1967
CRAFT, CLYDE O.	1967
DUENK, LESTER G.	1966
GARBEE, EUGENE E.	1949
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
GHEEN, WILLIAM L.	1970
HAHN, MARSHALL S.	1967
HANKS, WILLIAM S.	1966
HARNEY, LEON T.	1967
IRVINE, FLEET R.	1968
ISOM, VERNON H.	1970
MAGOWAN, ROBERT E.	1967
MC NEILL, JOSEPH G.	1970
PHILLIPS, KENNETH	1950
RICH, MILDRED K.	1958
SOLIMAN, ABDALLA M.	1967
SOMMERS, WESLEY S.	1961
STELZNER, RAYMOND R.	1969
TUCKER, CASEY A.	1965

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AUTHOR	DATE
EVANS, HARRY L.	1953
HILL, JAMES L.	1953
PHILLIPS, KENNETH	1950
SWAENGSUGDI, THANOO	1959

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AUTHOR	DATE
ABDULLABI, BAKRI	1971
ABRAHAM SR, ANSLEY A	1956
ADAMS, MAYNARD F.	1971
AGUIRRE, EDWARD	1966
ALLEN, WILSON S.	1936
ANDERSON, ERNEST F.	1966
ANDERSON, HERBERT A.	1953
BAILEY, GERALD D.	1964
BAILEY, MILTON J.	1968
BAKER, GLENN S.	1968
BEARDEN, WILLIAM W.	1967
BECKER JR, CHARLES W	1967
BEKTON, WILLIAM E.	1965
BERRY, ARTHUR D.	1967
BIEWALD, EDWARD C.	1969
BLACK, RALPH R.	1959
BLEEKE, MILTON H.	1968
BOONE, JAMES L.	1966
BORUM, JOHN F.	1969
BOWERS, VICTOR L.	1941
BOWMAN, JAMES E.	1958
BOWSER, JAMES A.	1960
BRENHOLTZ, GERALD S.	1967
BROEMAER, GARY M.	1968
BROWN, GEORGE C.	1963
BRUSH JR, GEORGE W.	1969
BZOWSKI, EDWARD D.	1969
CAMPBELL, ROBERT A.	1961
CARR, EVA R.	1970
CAULEY, MICHAEL J.	1971
CAULEY, MICHAEL J.	
CHAMPION, GEORGE	1965
CHATFIELD, WILLIAM D	1955
CHUANG, YING C.	1967
COCHRAN, LESLIE H.	1968
COLEMAN, WAYNE D.	1967
CORFIAS, JOHN C.	1967
CRABTREE, JAMES S.	1967
CRAWFORD JR, BRYANT	1961
CRAWFORD, HAROLD W.	1960
DANOVITZ, SAUL	1957
DARDEN, BYRNES L.	1951
DAS, RADHA C.	1950
DAVENPORT, JOE U.	1959
DAVIS, JIM L.	1966
DECKER, HOWARD S.	1953
DENNIS, ERVIN A.	1966
DITZLER, WALTER E.	1953
DOTY, CHARLES R.	1968
DOWNS, WILLIAM A.	1968
DRAZEK, STANLEY J.	1950
DUNCAN, GLENN S.	1950
EATON, MERRILL T.	1932
ELDER, WALTER T.	1941
ELLINGTON, MARK	1936
ENGELBREKTSON, SUNE	1961
FALLS, JOHN E.	1968
FECIK, JOHN T.	1970
FISHER, RICHARD E.	1956
FLEMING, BRUCE E.	1969
FLUCK, BRYAN V.	1970
FORKNER, WILLIAM R.	1968
FOSTER, ROBERT J.	1969
FRITZ, ROBERT C.	1960
GADBOIS, ROBERT L.	1968
GAUTHIER, MICHAEL K.	1972
GEHRING, GLEN S.	1969
GILLIE SR, ANGELO C.	1967
GLOGOVSKY, RONALD J.	1970
GOLD, CLARENCE H.	1967
GOLDBERG, JOEL	1971
GOLOMB, ARTHUR E.	1962
GRANNIS, GARY E.	1970
GRIFFIN, RAYMOND V.	1965
GRONEMAN, CHRIS	1950
GUDITUS, CHARLES W.	1965
HAMPTON JR, ISAAC P.	1959
HANKIN, EDWARD K.	1947
HANSEN, JOHN R.	1970
HANSEN, MAX E.	1964
HARPER, HERBERT D.	1934
HARRIS, RICHARD	1970
HARRIS, VIRGINIA J.	1961
HARRISON JR, PAUL E.	1955
HAUENSTEIN, ALBERT D	1966
HAUER, NELSON A.	1949
HAUSER, ROGER E.	1971
HAWS, ROBERT W.	1947
HEGGEN, JAMES R.	1967
HEIN, EDWARD C.	1969
HENNIG, JAMES F.	1970
HILL, FREDERICK W.	1942
HILL, JAMES L.	1953
HILTON, ROSS C.	1970
HOLTROP, WILLIAM F.	1948
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
HUKILL, VIRON N.	1958
HUNT, DE WITT T.	1939
INGRAM, FRANKLIN C.	1966
INGRAM, MAURICE D.	1971
IRGANG, FRANK J.	1956
IRVINE, FLEET R.	1968
ISOM, VERNON H.	1970
JACKEY, DAVID F.	1933
JENKINS JR, JAMES	1955
JENKINS, JOSEPH R.	1971
JOHNSON, DELTON L.	1968
JOHNSON, FRANKLIN R.	1969
JOHNSON, IRA H.	1955

JOHNSON, RAYMOND C.	1971
JOHNSON, WAYNE C.	1969
JORDAN, KENNETH F.	1969
JORDAN, THOMAS F.	1942
KAHRMANN, ROBERT G.	1970
KAISER, HENRY	1968
KAVICH, LAWRENCE L.	1964
KAVIEFF, MELVIN C.	1961
KEIM, LAWRENCE	1966
KEITH, CHARLES W.	1964
KELLY, MICHAEL V.	1968
KENT, RONALD W.	1931
KETCHAM, GEORGE W.	1963
KICKLIGHTER, CLOIS E	1966
KIMBALL, KENNETH R.	1967
KINKER, H. ROBERT	1949
KLEINTJES, PAUL L.	1953
KOHLER, RICHARD C.	1951
KURTZ, HARMON H.	1959
LANGFORD, AL G.	1969
LARSON, DELMAR L.	1964
LARSON, MILTON E.	1965
LAUBENTHAL, CRAIG D.	1969
LEAN, ARTHUR F.	1948
LEWIS, MYRON E.	1970
LIGHT, KENNETH F.	1967
LITTLE, RICHARD L.	1968
LJOSTAD, RODNEY A.	1965
LOGUE, JAY L.	1959
LOPEZ, GUILLERMO	1970
LOWMAN, CLARENCE L.	1967
LUDINGTON, JOHN R.	1940
MARRAH, JOHN A.	1970
MC DOWELL, LEONARD C	1964
MEHAIL, SPIRO	1971
MEISNER, ROBERT G.	1967
MELLINGER, BARRY L.	1972
MILLER, MARK E.	1967
MILLS, BOYD C.	1967
MOHEF, N. F.	1968
MONGERSON, MARTIN D.	1968
MOORE, LELAND B.	1970
MURBACH, NELSON J.	1949
NEALIS, MICHAEL F.	1951
NESTEL, GERALD E.	1970
NEWKIRK, LOUIS V.	1929
OLIVER, GEORGE L.	1970
OLSON, DELMAR W.	1957
PAINE, HARRY W.	1943
PANKOWSKI, DALLAS J.	1966
PARDINI, LOUIS J.	1967
PASSMORE, JAMES L.	1968
PAULIN, HENRY S.	1964
PERDUE, SAUL M.	1954
PERKINS, LAWRENCE H.	1967
PHILLIPS JR, MILTON	1967
PHILLIPS, KENNETH	1950
PHILLIPS, LOREN D.	1954
QUIER, GEORGE T.	1969
RANDEL, STEPHEN V.	1957
REED, WILLIAM T.	1947
REIMER, MILTON K.	1968
REMICK, EDWARD L.	
RICE, CHARLES M. M.	1958
RICH, MILDRED K.	1958
RICHARDS, MAURICE F.	1950
RINCK, JOE A.	1968
RINEHART, RICHARD L.	1966
ROBBINS, EVELYN G.	1949
ROBERTSON JR, LUTHER	1970
ROBINSON, CLARENCE L	1972
ROSSER, ARTHUR J.	1968
ROTHMAN, ROBERT A.	1969
ROWNTREE, URWIN	1951
RUDIGER, ELMER R.	1952
RUDISILL, ALVIN E.	1969
RUSSELL, ELLSWORTH M	1950
SALMON, DANIEL A.	1965
SANDERS, LEROY J.	1967
SCHMITT, MARSHALL L.	1953
SCOBEY, MARY-MARGARE	
SECHREST, CHARLES H.	1953
SEDGWICK, LORRY K.	1965
SEEHOFF, JESSE	1942
SEIGLER, CLAUDE I.	1970
SELLON, WILLIAM A.	1950
SEXTON, WILLIAM E.	1965
SHOEMAKER, CHARLES E	1961
SINE JR, JOHN M.	1972
SMALLEY, LEE H.	1962
SMITH, ROBERT E.	1928
SNITZ, RUBEN H.	1931
SPAULDING, ROLAND H.	1936
SPENCE, WILLIAM P.	1957
SPRANKLE, NORMAN H.	1971
STAPLES, JAMES R.	1970
STEGEMAN, ARTHUR L.	1957
STEPHENS, GEORGE T.	1969
STERN, JACOB	1964
STEVENSON, JAMES E.	1953
STRANDBERG, C. E.	1963
STRONG, MERLE E.	1958
STUESSY, EUGENE L.	1969
TAGGART, LEO R.	1953
THORP, JOHN H.	1945
TIERNEY, WILLIAM F.	1952
TIMPER, HANS E.	1972
VAN TASSEL, RAYMOND	1948
VANDEBERG, LOYD W.	1955
VANHERCK, DON V.	1966
VASEK, RICHARD J.	1967
WAGNER, EDGAR S.	1960
WAINA, RICHARD B.	1969
WAITKUS, LORIN V.	1971
WAITKUS, LORIN V.	1971
WALL, GUSTAVE S.	1951
WALLIS, CARL R.	1969
WEBER, EARL M.	1961
WEST, WILLIAM E.	1969
WHITE, LELAND W.	1966
WIGEN, RAY A.	1957
WILSON, WADE	1954
WINTERS, KENNETH W.	1970
WOCKENFUSS, WILLIAM	1960
WOLANSKY, WILLIAM D.	1968
WOODEN, RALPH L.	1956
WRIGHT, LAWRENCE S.	1954
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
AMELON, DONALD J.	1969
BALL, CHARLES E.	1958
BENSON, M. J.	1967
CALEY, PAUL C.	1969
DUNFEE, EMERY S.	1964
JOHNSTON, JOHN L.	1956
JOLLY, FRANK H.	1970
LEMASTER, LELAN K.	1961
WORTHINGTON, ROBERT	1958
WRIGHT, WELCOME E.	1953

DESN

AUTHOR	DATE
ABITIA, FREDDIE	1971
ABITIA, FREDDIE	1971
ALDEN, RICHARD S.	1971
ATKINS, MICHAEL B.	1971
BAILEY JR, JAMES H.	1961
BARLOW, GARY C.	1967
BAUER, CARLTON E.	1955
BAUGHER, RICHARD W.	1972
BEKTON, WILLIAM E.	1965
COLCLASER JR, ROBERT	1968
DOELLINGER, KEITH E.	1971
FORKNER, WILLIAM R.	1968
GUERARD, MICHAEL P.	1971
HANKS, WILLIAM S.	1966
JOHNSON, ROBERT I.	1958
LENIO, ROBERT	1971
REED, RICHARD L.	1971
STORY, CHARLES H.	1970
TATE, JOHN B.	1971
TUTHILL, RUSSELL	1970
WALSTON, HARRY W.	1970
WEALE, MARY J.	1968
WEHRLI, ROBERT	1968
WHITE, BRUCE H.	1967

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AUTHOR	DATE
BEACHAM, HERBERT C.	19
BENJAMIN, GERALD E.	1968
BRITT, ROBERT D.	1966
CANDOLI, I. C.	1967
ELMER, FRANCES W.	1967
ENZIAN, HAROLD J.	1967
FINNEY JR, JOHN D.	1967
GILLILAND, HUGH R.	1967
JENSEN, THOMAS R.	1968
LOWMAN, CLARENCE L.	1967
MICHIE, JACK	1968
REED, WILLIAM T.	1947
RICH, MILDRED K.	1958
ROBINSON, WILLIAM D.	1971
SEEHOFF, JESSE	1942
STANTON, MILDRED B.	1938
TURECHEK, ARMIN G.	1967
WOODEN, RALPH L.	1956

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AUTHOR	DATE
MONEY, HOMER E.	1956
RILEY, E. C.	1970

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AUTHOR	DATE
BLEDSOE, HARRY J.	1968
DRAKE JR, FRANCIS O.	1969
HAWLK, ROBERT H.	1960
HILL, CHARLES R.	1950
MEIERHENRY, WESLEY C	1946
MICHELSON, EINO S.	1956
PREITZ, CLARENCE H.	1969
SHIBLER, HERMAN L.	1941
SILVEY, WRAY D.	1950

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AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ALTUS, DAVID M.	1972
AMTHOR, WILLIAM D.	1967
ARMBRUST, ROBERT W.	1969
ATKINS, MICHAEL B.	1971
BAILEY JR, JAMES H.	1961
BARBER, CARL S.	1967
BARLOW, GARY C.	1967
BASS, RONALD E.	1971
BAUER, CARLTON E.	1955
BAUGHER, RICHARD W.	1972
BECK, BURREL H.	1967
BECK, EUGENE J.	1968
BECK, JOHN R.	1964
BENJAMIN, NEAL B.	1969
BETTENCOURT, WILLIAM	1953
BIEWALD, EDWARD C.	1969
BJORKQUIST, DAVID C.	1965
BLUM, ROBERT E.	1965
BOWMAN, ERNEST L.	1932
BROADHURST, FREDERIC	1969
BROWN, WILLIAM E.	1964
BROWNRIGG, JERRY R.	1962
BURNS, WILLIAM E.	1965
CAMPBELL, GORDON	1969
CASE, MERL E.	1971
CLARK, FRANCIS E.	1971
COLCLASER JR, ROBERT	1968
CRAFT, CLYDE D.	1967
CRAWFORD, JOHN E.	1941
DOELLINGER, KEITH E.	1971
DYKE, EUGENE L.	1962
EARLE, JAMES H.	1964
ELLIS, NEIL G.	1966
ERICKSON, RICHARD C.	1966
FLEMING, BRUCE E.	1969
FORKNER, WILLIAM R.	1968
FRANCHAK, STEPHEN J.	1971
FRANCHAK, STEPHEN J.	1971
FRESCHET, FERUCIO	1969
GIETL, RUDY E.	1971
GLAZENER, EVERETT R.	1958
GROVES, EDWIN D.	1970
GUERARD, MICHAEL P.	1971
GUNDERSON, B. HARRY	1949
HARNEY, LEON T.	1967
HATLEY, JIMMY D.	1969
HEPLER, EARL R.	1957
HERBERTS, ROGER E.	1971
HICKMAN, KEITH F.	1967
HILL, CLAIR S.	1971
HOLT, JAY F.	1970
HORINE, JOHN W.	1961
HUSUNG, WILLIAM T.	1970
JACOBSEN, ECKHART A.	1957
KESEMAN, CHARLES E.	1967
KLEHM, WALTER A.	1937
KRANTZ, MATTHEW B.	1970

LEMONS, CLIFTON D.	1965
LEVANDE, JAMES S.	1972
LOGUE, JAY L.	1959
LUETKEMEYER, JOSEPH	1961
MAGOWAN, ROBERT E.	1967
MC CAGE, RONALD D.	1970
MC CAGE, RONALD D.	1970
MC CLURE, CLOIS A.	
MIDDLETON, WILLIAM H	1962
MOEGENBURG, LOUIS A.	1969
MUDGETT, ALBERT G.	1958
MULLER, ERWIN T.	1938
MUNS III, NEDOM C.	1969
NOLL, ROBERT F.	1967
NORMAN, RALPH P.	1955

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AUTHOR	DATE
AMTHOR, WILLIAM D.	1967
BABCOCK, JAMES G.	1969
BECK, EUGENE J.	1968
COZZENS, CHARLES R.	1965
EARLE, JAMES H.	1964

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AUTHOR	DATE
ATHANASIOU, ROBERT B	1969
BOWSER, JAMES A.	1960
CHRISTIAN, JACK B.	1969
CLARK, JAMES V.	1967
FALKENSTINE, JAMES C	1965
FRAZIER, WILLIAM D.	1966
FRYE, RONALD M.	1962
FULLER, JOHN A.	1971
GADBOIS, ROBERT L.	1968
GILBREATH, TOMMY D.	1971
GILBREATH, TOMMY D.	1971
HANSEN, MAX E.	1964
MARSHALL JR,THOMAS C	1941
MIDILI, JOHN A.	1970
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MOSS, JOHN E.	1962
MUNISTERI, ANTHONY	1971
NEWBURY, DAVID N.	1967
RALSTROM, STIG E.	1969
ROBINSON, CLARENCE L	1972
SILVER, HARVEY A.	1967
STALLINGS, DANIEL N.	1969
STILLERMAN, MANUEL	1970
STROUT, GEORGE M.	1970
WALSH, RAYMOND J.	1965
WHINFIELD, RICHARD W	1969
WHITE, LELAND W.	1966
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CRAWSHAW, MARSHALL R	1950
JANZEN, JOHN W.	1971
KAVICH, LAWRENCE L.	1964
LOCKE, LEWIS A.	1969
SONDERMAN, ROBERT B.	1956
WALLACE, NORMAN E.	1968

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AUTHOR	DATE
NYSTROM, DENNIS C.	1969
PAPP, ALEXANDER G.	19
RANDEL, STEPHEN V.	1957
RAY, J. EDGAR	1944
RICHARDS, MAURICE F.	1950
ROUTH, JERRY D.	1970
ROWLETT, JOHN D.	1960
RYAN, ROBERT D.	1964
SCHANBACHER, EUGENE	1961
SCHWEINFURTH, LUDWIG	1969
SEXTON, WILLIAM E.	1965
SMITH, DARRELL L.	1969
SMITH, FREDDY J.	1970
SMITH, KAY H.	1962
STANFIELD, FOSTER A.	1971
STANFIELD, FOSTER A.	1971
STEGMAN, GEORGE K.	1962
STORY, CHARLES H.	1970
STREICHLER, JERRY	1963
SUESS, ALAN R.	1962
SULLIVAN, FRANK V.	1964
THATCHER, GLENN M.	1970
TORBETT, DANIEL L.	1965
VESPER, KARL H.	1969
VOLPE, GERALD	1969
WALKER, JOE W.	1970
WALLIS, CARL E.	1969
WALSTON, HARRY W.	1970
WEHRLI, ROBERT	1968
WILKES, DORAN F.	1966
WINEGAR, GARY H.	1969

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AUTHOR	DATE
ADAMS, ROBERT W.	1947
AUER, HERBERT J.	1971
BADER, LOIS	1932
BAKER, GLENN E.	1966
BERGMAN, KENNETH H.	1963
BRENNER, CHARLES J.	1968
BROE, JOHN R.	1962
BROWN III, ALPHA O.	1971
BROWN III, ALPHA O.	1971
BROWN, ALPHA O.	1971
BROWN, GEORGE J.	1960
BRUDZYNSKI, ALFRED J	1966
DAS, RADHA C.	1950
DECK, WILLIAM L.	1955
DUKES, GLENN F.	1969
DUNFEE, EMERY S.	1964
FARR, WILBUR J.	1958
FOLEY JR, JOHN P.	1968
FOWLER, RICHARD J.	1965
FRANCIS, GEORGE H.	1966
FROELICH, DONALD M.	1970
GARNER, CAREY C.	1969
GERNE JR, TIMOTHY A.	1967
GILLIE SR, ANGELO C.	1967
GOLDBERG, JOEL	1971
HAMPTON JR, ISAAC P.	1959
HANCOX, FREDERICK J.	1969
HARMON, JAMES S.	1969
HERRING, TOD H.	1962
HILL, EDWIN K.	1968
HOBBS, ADDISON S.	1971
HOFER, JARREL	1969
INABA, LAWRENCE A.	1970
INGRAM, MAURICE D.	1971

JELDEN, DAVID L.	1960
JELDEN, DAVID L.	1971
JOHNSON, DOUGLAS H.	1969
JOHNSON, FRANK F.	1971
JOHNSTON, JOHN L.	1956
KAPLAN, HAROLD	1956
KAVANAUGH, WILLIAM A	1955
KLEIMAN, HERBERT S.	1966
KOUTNIK, PAUL G.	1968
LARSON, IRVING W.	1969
LEASE, ALFRED A.	1964
LEVENSON, WILLIAM B.	1937
LUNDY, LYNDALL L.	1966
LYONS, RICHARD A.	1969
MANESS, MARION T.	1969
MARCINOWSKI, MARY E.	1971
METZLER, JOHN H.	1970
MILLER, DAVID H.	1971
MILLS, BOYD C.	1967
MORGAN SR, LEO D.	1966
MUSGROVE, WILLIAM R.	19
NICKERSON, PAUL S.	1947
OHLSON, ELI E.	1943
PANKOWSKI, DALLAS J.	1966
PEARSON, WILLIAM W.	1967
PEITHMAN, ROSCOE E.	1955
PERKINS, LAWRENCE H.	1967
PITTMAN, FRANK M.	1970
PRATZNER, FRANK C.	1969
RAICHLE, HENRY F.	1969
RICKER, PHILLIP E.	1965
RUEHL, PHILIP W.	1961
RUITER, WILLIAM W.	1971
RUSSELL JR, JAMES A.	1967
SCHULER, CHARLES A.	1966
SFIGLER, CLAUDE I.	1970
SHIGETOMI, SAMSON S.	1970
SIMONS, JEROLD J.	1967
SLATTER, JOHN B.	1970

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AUTHOR	DATE
SMITH, BRANDON B.	1968
SORENSEN, RONALD L.	1964
STIEGLER, LAIRD B.	1971
STILLERMAN, MANUEL	1970
TEEL, DEAN A.	1967
TREGO, JOHN W.	1958
TURNER, ROBERT E.	1957
VASEK, RICHARD J.	1967
VOGEL, RICHARD F.	1968
WASHBURN, KENNETH R.	1971
WEEDE, GARY D.	1967
WEFFENSTETTE, WALTER	1965
WILSON, RUSSELL C.	1971
WRIGHT, JERAULD B.	1969
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AUTHOR	DATE
BAUGRUD, KIM J.	1968
BICKNELL, WILLIAM C.	1942
BJORKQUIST, DAVID C.	1965
BONDE, ROBERT G.	1964
BROWN, ROBERT D.	1955
BRUCE, PHILLIP L.	1964
BRUDZYNSKI, ALFRED J	1966
CHAMBERLAIN, DUANE G	1954
CHAMPION, GEORGE	1965
DOANE, RAYMOND C.	1956
DOUTT, RICHARD F.	1965
DOWNS, WILLIAM A.	1968
DUNCAN, GLENN S.	1950
FAGAN, RAYMOND E. B.	1954
GERNE JR, TIMOTHY A.	1967
GILBERT, HAROLD G.	1955
GOFF, WILLIAM H.	1967
GRIFFIN, RAYMOND V.	1965
GUNTHER, THERESA C.	1931
HANSEN, RUSSELL G.	1964
HAWS, ROBERT W.	1947
HERRICK, IRVING W.	1969
HORBAKE, R. LEE	1942
HORNBLAKE, R. LEE	1939
HURLEY, CARL E.	1971
INABA, LAWRENCE A.	1970
INGRAM, FRANKLIN C.	1966
JOHNSON, ROBERT I.	1958
KIRKWOOD, JAMES J.	1970
KOHLER, RICHARD C.	1951
KRUMBIEGEL, WALTER O	1955
LJOSTAD, ROONEY A.	1965
LLOYD, CLIFFORD J.	1968
LOATS, HENRY A.	1950
LOPEZ, DANIEL C.	19
LOW, FRED G.	1963
PAINE, OLIVE	1930
PALOW, WILLIAM P.	1969
PEEL, NANCY D.	1967
PERSHERN, FRANK R.	1967
POWER, ANDREW T.	1955
RICHARDS, KENVYN B.	1970
ROBINSON, FRANK E.	1955
SCOBEY, MARY-MARGARE	
SQUIBB, ALBERT R.	1967
SWERDLOW, ROBERT M.	1969
THIEME, EBERHARD	1965
TRAPANESE, MENNA G.	1964
VANHERCK, DON V.	1966
WILLIAMS III, WALTER	1963

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AUTHOR	DATE
AKHUN, ILHAN I.	1961
ALTUS, DAVID M.	1972
ATHANASIOU, ROBERT B	1969
BOONE, JAMES L.	1966
BRACEY, HYLER J.	1969
BRADSHAW, OTTIE L.	1968
BRAUN, ROBERT W.	1971
BROTHERTON, WILLIAM	1964
CLAUSEN, JOHN N.	1955
COLCLASER JR, ROBERT	1968
DAVID, WILLIAM J.	1968
DEAN, C. THOMAS	1951
DUNLAP, EUGENE W.	1962
DYKE, EUGENE L.	1962
ELLIOTT, EARL S.	1967
FOSTER, ROBERT J.	1969
GARNER, CAREY C.	1969
GROSS, ANDREW C.	1968
GROVES, EDWIN D.	1970
HANSEN, MAX E.	1964
HEPLER, EARL R.	1957
HOLT, JAY E.	1970
HUNT, DE WITT T.	1939
HUNTER, ROBERT F.	1970
JOHNSTON, WALLACE L.	1968
KANTER, STUART A.	1968
KRUBECK, FLOYD E.	1954
LAUBENTHAL, CRAIG D.	1969
LEMONS, CLIFTON D.	1965
LOGUE, JAY L.	1959
MANGANELLI, FRED D.	1959
MC DOUGLE, LARRY G.	1971
MILLER, AARON J.	1966
MUDGETT, ALBERT G.	1958
O BRYANT, DAVID C.	1970
O CONNELL, JOHN F.	1971

RANDEL, STEPHEN V.	1957
RAY, REX E.	1966
RICHARDS, MAURICE F.	1950
RINEHART, RICHARD L.	1966
ROTHMAN, ROBERT A.	1969
RUTEN, WILLIAM H.	1953
RYAN, ROBERT D.	1964
SCHWEINFURTH, LUDWIG	1969
SONNER, JAN R.	1972
STAMM, HAROLD S.	1968
STEGMAN, GEORGE K.	1962
STORY, CHARLES H.	1970
STUART, WILLIAM R.	1972
TERRY, THOMAS P.	1972
TRAMBLEY, JOHN B.	1969
VAN DERSLICE, JOHN F	1967
VESPER, KARL H.	1969
WAINA, RICHARD B.	1969
WALLACE, DONALD F.	1972
WATERSTREET, DONALD	1969
WIEHE, THEODORE E.	1954

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CANDOLI, I. C.	1967
CAULEY, MICHAEL J.	
DOLAN, ROBERT E.	1971
SUMTER, PAUL E.	1969
YUNG, JOHN E.	1965

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BUNTEN, CHARLES A.	1955
CUNNINGHAM, BERYL M.	1952
DOUTT, RICHARD F.	1965
ENVICK, DONALD D.	1968
ERICKSON, JOHN H.	1953
HUMBLE, MILFORD K.	1937
KLEHM, WALTER A.	1937
MC ARTHUR, ROSS J.	1955
MC GAW, SIDNEY E.	1952
MILLER, JOHN G.	1954
MILLER, THOMAS W.	1953
ROSS, RAYMOND J.	1966
WAGNER, EDGAR S.	1960
WINEGAR, GARY H.	1969

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AUTHOR	DATE
ALLEN, WILSON S.	1936
BEACHAM, HERBERT C.	19
CHAVOUS, ARTHUR M.	1945
COTTON, GEORGE R.	1944
CURTIS, BYRON W.	1968
ENCK, HENRY S.	1970
FINNEY JR, JOHN D.	1967
GILLILAND, HUGH R.	1967
HAIGWOOD, THOMAS L.	1959
HALL, CLYDE W.	1953
HARRISON, ELTON C.	1948
HILLSMAN, SALLY	1970
JACKSON, THOMAS A.	1962
MILLER, WAYNE E.	1969
NASH, MC KINLEY M.	1972
O BRYANT, DAVID C.	1970
PHILLIPS, AUGUSTUS C	1941
PRITCHARD, MIRIAM C.	1937
REED, WILLIAM T.	1947
STUART, IRVING R.	1951
TAYLOR, CYRUS B.	1955
TURNER, ALFRED B.	1941
TURNER, BRIDGES A.	1941
TURNER, BRIDGES A.	1941
WOODEN, RALPH L.	1956

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AUTHOR	DATE
ANDREYKA, ROBERT E.	1969
ARNOLD, DANIEL S.	1968
BURKERT, WILLIAM G.	1970
CAIN, JOHN N.	1970
CLABAUGH, RICHARD D.	1971
DOUCETTE, RUSSELL J.	1972
DRAKE, JAMES B.	1972
EHRENBORG, JOHN D.	1963
ENSMAN, LEO M.	1957
FORREST JR, LEWIS C.	1970
FRAGALE, MARVIN J.	1969
GIANINI, PAUL C.	1968
GUNDERSON, ORLEY D.	1971
HAGEN, DONALD L.	1972
HAMMACK, CHARLES K.	1967
HOLMEN, HOLGER E.	1969
JAMES, WILLIAM C.	1971
LARSON, MILTON E.	1965
LINDAHL, DONALD G.	1971
LOEPP, FRANZIE L.	1970
MAW, JAMES L.	1971
MC KEE, RONALD R.	1971
MC LONEY WIRT L.	1965
MEYER, JOHN D.	1970
MILLER, JACK D.	1971
NEASHAM, ERNEST R.	1968
OBERT, JOHN T.	1973
OLIVER, WILMOT F.	1967
OLIVER, WILMOT F.	1967
OLSON, RICHARD R.	1971
OPPELT, MARION O.	1967
PFAHL, ALVIN K.	1971
RIGGS, DONALD D.	1971
RUDISILL, ALVIN E.	1969
SCHMITT, CARLOS R.	1971
SPAULDING, LLOYD F.	1971
STANGL, OTTO A.	1968
STEPHENSON, LESLIE E	1958
STUTEVILLE, CLAUDE E	1971
SUTTON, FRED C.	1961
TAKIS, JOHN P.	1972
TERRY, THOMAS P.	1972
TOLLEY, CHARLES H.	1969
WALLS, W. DALE	1964
WATKINS, KENNETH E.	1966
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AUTHOR	DATE
ANDREYKA, ROBERT E.	1969
ARMSTRONG, KENNETH E	1971
BALL, JOHN E.	1971
BATES, IVAN W.	1971
BLAKELEY, THOMAS A.	1949
BOWDOIN, PAUL	1966
BRANDON, GEORGE L.	1952
BRENCKLE, AUTHUR G.	1968
BRINKMAN, FRED J.	1970
BROE, JOHN R.	1962
BUTTERY, WILLIAM A.	1971
CAMBRIA, SOPHIA T.	1945
CLENDENNING, LEE R.	1972
COLGAN, FRANCIS E.	1967
COMBS, STANLEY L.	1948
CONNER, JOHN D.	1971
COOMER, JERRY W.	1971
CRUMP, DANNY L.	1968
CUMMINGS, LAWRENCE J	1969
DEADY, JOHN J.	1970
DOELLINGER, KEITH E.	1971
DUGGER, WILLIAM E.	1970
ELLIOTT, BURTON L.	1971
ELMGREN JR, G. THEOD	1963
ENVICK, ROBERT M.	1970
EPSTEIN, JACK H.	1971
FACE, WESLEY L.	1963
FEGAN, HAROLD J.	1971
FRANCHAK, STEPHEN J.	1971
GALLOWAY, JOEL D.	1972
GALLUP, LELLAND L.	1970
GISRIEL, AUSTIN E.	1959
GORDON, KENNITH G.	1971
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HALES, JAMES A.	1972
HALFIN, HAROLD H.	1973
HAMMOND, HOWARD R.	1971
HANSEN, EDITH H.	1972
HANSON, ROBERT R.	1970
HARRIS, ROBERT C.	1970
HEALAS, DONALD V.	1972
HEILMAN, CASMER F.	1970
HENAK, RICHARD M.	1971
HERRING, TOD H.	1962
HILL, RICHARD E.	1970
HOERNER, HARRY J.	1969
HOUSE, ELAINE	1970
INGRAM, THEODORE	1971
IVES, QUAY D.	1971
JAMES, WILLIAM E.	1971
JOHNSON, VERNER B.	1966
JONES, GUY R.	1971
KAISER, RONALD E.	1971
KARNES, JOHN W.	1951
KOHRAM, GEORGE E.	1952
KREPEL, WAYNE J.	1967
KRUPPA, RICHARD A.	1970
KYNARD, ALFRED T.	1960
LAMBERT, JAMES H.	1940
LANDIS, RUSSELL H.	1940
LANMAN, RICHARD W.	1953
LAPIDUS, GEORGE	1954
LARSON, RAYMOND H.	1951
LE BLANC, DARRELL R.	1971
LEAVITT, WILLIAM C.	1969
LIEN, DAVID A.	1971
LIEN, DAVID A.	1972
LINTON, JOHN A.	1951
LOEPP, FRANZIE L.	1970
LONG, GILBERT A.	1970
LOW, FRED G.	1963
LYBARGER, ALVIN E.	
MAC DONALD, MANLEY E	1944
MC CABE, FRED J.	1970
MC ROBBIE, J. M.	1963
MEHALLIS, GEORGE	1963
MEDSKY, PAUL R.	1967
MESSERSCHMIDT, DALE	1967
MEYER, JOHN D.	1970
MILLER, DAVID H.	1971
MILNOR, BRENT T.	1971
MONROE, ALLEN L.	1970
MOODY, RICHARD D.	1968
MOORE, LELAND B.	1970
MOULLETTE, JOHN B.	1970
MUND, RICHARD G.	1970
NELSON, HILDING E.	1962
NICHOLS JR, GEORGE V	1971
NORTON, ELIZABETH N.	1970
OAKS, MERRILL M.	1970
OMAN, RONALD N.	1971
PETER, RICHARD F.	1970
POLK, HAROLD J.	1969
RAU, GERALD N.	1971
REBHORN, ELDON A.	1972
ROBERTS, EDWARD R.	1971
ROBINSON, MENDEL L.	1970
SHIGETOMI, SAMSON S.	1970
SIMPSON, JAMES L.	1970
STAMM, HAROLD S.	1969
STANFIELD, FOSTER A.	1971
STANGL, OTTO A.	1968
STENSON, ORVIS J.	1971
STEPHENSON, LESLIE E	1958
STUTEVILLE, CLAUDE E	1971
TATE, HAROLD S.	1951
ULLERY, JESSE W.	1971
VAN DERSLICE, JOHN F	1967
VAN GIGCH, JOHN P.	1968
VOLK, VINCENT A.	1955
WALDORF, ROBERT J.	1971
WEBB, R. IAN A.	1971
WINDHAM, BILLY L.	1972
WITT, NORMAN E.	1969
WOOD, GRANT R.	1970
WOODS, WILLIAM H.	1971
WRIGLEY, MARGARET	1968

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ABRAHAM SR, ANSLEY A	1956
ABRAMSON, BERNARD	1950
ADAMS, DEWEY A.	1966
ALAKI, MADANI A.	1972
ALDEN, RICHARD S.	1971
ALDRICH III, DANIEL	1972
ALSIP JR, BENJAMIN H	1965
ANDREWS JR, JOE R.	1968
ANDREWS, EARL R.	1968
ARNOLD, FRANK J.	1932
ARONSON, NORMA	1967
ASHLEY, LAWRENCE F.	1936
ATKINS, MICHAEL B.	1971
BAILEY, MILTON J.	1968
BAKER, GEORGE L.	1970
BAKER, GLENN E.	1966
BALDWIN, THOMAS R.	1971
BARLOW, GENE A.	1971
BARON, ANDREW W.	1968
BARROW, RICHARD W.	1969
BARROWS, FRANK B.	1970
BEACH, CHARLES K.	1941
BEACH, ROBERT B.	1967
BECK, BURREL H.	1967
BEDWELL, NORMAN W.	1951
BELL, CHARLES L.	1964
BERGVIN, PAUL E.	1945
BISHOP, JAMES R.	1970

BLECKMAN, JUDITH C.	1971
BLOCK, MURRAY H.	1953
BOAZ, HOLLAND E.	1965
BOGETICH, THOMAS M.	1972
BOHN, RALPH C.	1957
BONDE, ROBERT G.	1964
BORUM, JOHN F.	1969
BOSS, RICHARD D.	1968
BOSTROM, EDWIN O.	1971
BOTTOMS, JAMES E.	1965
BOWLAN, SIZEMORE	1971
BOYER, CAROLINE K.	1966
BOYER, JOHN W.	1970
BRANTNER, SEYMOUR T.	1962
BRENHOLTZ, GERALD S.	1967
BRENHOLTZ, HAROLD R.	1957
BREWSTER, JAMES H.	1971
BRIGHAM, ELDEN L.	1950
BRO, RONALD D.	1971
BROE, JOHN R.	1962
BRUCE, PHILLIP L.	1964
BRUSH JR, GEORGE W.	1969
BURDETTE JR, WALTER	1955
BURKERT, WILLIAM G.	1970
BURROUGHS, MARVIN G.	1970
CAGE, BOBBY N.	1968
CAIN, CECIL R.	1958
CALLEN, LOUIS J.	1952
CAMPION, HOWARD A.	1941
CARLSEN, DARVEY E.	1961
CARR, EVA R.	1970
CARR, HAROLD L.	1970
CASSIMATIS, PETER J.	1967
CHARONCHAI, RUANG	1963
CHATFIELD, WILLIAM D	1955
CHRISMAN, JOSEPH P.	1970
CLAUSEN, JOHN N.	1955
CLEVELAND, JOHN M.	1961
COCHRAN, LESLIE H.	1968
COLEMAN, JAY M.	1971
COLEMAN, WAYNE D.	1967
COLLINS, CHARLES J.	1968
COLLINS, HERMAN G.	1966
COLLINS, SAMUEL R.	1962
COOPER, JACK H.	1961
CORAZZINI, ARTHUR J.	1967
COTTON, GEORGE R.	1944
COX, ROBERT L.	1970
COZZENS, CHARLES R.	1965
CRAWFORD, JOHN E.	1941
CROMER, CHALMERS A.	1970
CROUCH, J. PAGE	1968
CRUMP, DANNY L.	1968
CRUMPTON, CHARLES R.	1952
CUONY, EDWARD R.	1953
DANAHER, EUGENE I.	1946
DANAHER, EUGENE I.	1946
DANIELS, BLAIR E.	1937
DANNENBERG, RAYMOND	1965
DANOVITZ, SAUL	1957
DAVENPORT, JOE U.	1959
DAVIDSON, JOHN E.	1968
DAVIS, WARREN C.	1936
DE VORE, PAUL W.	1961
DENNIS, ERVIN A.	1966
DENNISON, BOBBY	1970
DEVLIN, LEON G.	1971
DEVLIN, LEON G.	1971
DIEDRICK, WALTER E.	1971
DILIBERTO, MENNO	1968
DOANE, RAYMOND C.	1956
DOBSON, CLIFFORD G.	1956
DOLAN, ROBERT E.	1971
DOTY, CHARLES R.	1968
DOUGLASS, STEPHEN A.	
DOWNS, WILLIAM A.	1968
DRAKE JR, FRANCIS O.	1969
DUNCAN, GLENN S.	1950
DUNLAP, EUGENE W.	1962
EARLE, JAMES H.	1964
ECKER, LOUIS G.	1965
EDDY, EVAN M.	1956
EDWARDS, LEONARD D.	1971
EGGERS, JERRY R.	1970
EGGERS, JERRY R.	1970
EICHER, ROBERT S.	1968
EISENBERG, WILLIAM L	1947
ELDER, WALTER T.	1941
ENGELBART, LEON P.	1970
ENVICK, DONALD D.	1968
ENZIAN, HAROLD J.	1967
EPHRAIM, JOHN	1969
ERWIN, CLIFFORD H.	1963
ERWIN, WILLIAM R.	1963
ESTABROOKE, EDWARD C	1939
EVANS, WILSON A.	1954
FAGAN, BERNARD T.	1970
FAHS, ELDON E.	1967
FALES, ROY G.	1948
FALLS, JOHN E.	1968
FARAHBAKHSHIAN, EBRA	1967
FARMER, JOE H.	1950
FISHER, RICHARD E.	1956
FORBES, ROY H.	1970
FORKNER, WILLIAM R.	1968
FOSTER, ROBERT J.	1969
FRANK JR, HARRY E.	1968
FRANKSON, CARL E.	1948
FRANTZ JR, NEVIN R.	1967
FRAZIER, WILLIAM D.	1966
FROELICH, DONALD M.	1970
FUGAL, GLEN R.	1950
FUGLSBY, GLEN O.	1965
FUKAMIZU, RAYMOND H.	1972
GAILEY, DAVID S.	1969
GALLINGTON, RALPH O.	1947
GASSERT, WILLIAM M.	1972
GAUTHIER, MICHAEL K.	1972
GAVIN, GORDON O.	1968
GEBHART, RICHARD H.	1971
GIBSON, CHARLES H.	1968
GIFFORD, KENNETH K.	1970
GILBREATH, TOMMY D.	1971
GILLIE SR, ANGELO C.	1967
GILMAN, ROBERT A.	1969
GINTHER, RICHARD E.	1964
GLAU, JON E.	1970
GLENN, JOHN W.	1966
GOISHI, FRANK H.	1970
GRADWELL, JOHN B.	1971
GRAMBERG, MERLYN L.	1971
GRANNIS, GARY E.	1970
GRAY, KENNEY E.	1970
GRELL, DARRELL D.	1967
GRIFFIN, RAYMOND V.	1965
GRONEMAN, CHRIS	1950
GROSSEL, ROGER L.	1971
GROVER, JERRY D.	1968
GUERARD, MICHAEL P.	1971
GUNDERSON, B. HARRY	1949
HACKETT, DONALD F.	1953
HAIGWOOD, THOMAS L.	1959
HALL, CLARENCE E.	1969
HALL, JAMES F.	1954
HANKAMMER, OTTO A.	1936
HANSEN, PHILLIP W.	1970
HANSEN, RUSSELL G.	1964
HANSON, DURWIN M.	1956
HARPER, HERBERT D.	1934
HARRIS, EDWIN J.	1971
HARRIS, JAMES G.	1970
HARRIS, JAMES N.	1969
HARRIS, RICHARD	1970
HARRIS, SUE A.	1970
HARRISON JR, RUSSELL	1971
HARRISON, ELTON C.	1948
HAUER, NELSON A.	1949
HAUSER, ROGER E.	1971
HAWKINS, LESLIE V.	1953
HAWSE, JOHN E.	1964
HEATH, JAMES L.	1967
HELTON, H. L.	1958
HEMLER, HERMAN T.	1972

HENDRIX, SAMUEL D.	1942
HENDRIX, WILLIAM F.	1967
HEPLER, EARL R.	1957
HILL, CHARLES R.	1950
HILL, FREDERICK W.	1942
HILL, JAMES L.	1953
HILTON, ROSS C.	1970
HOBBS, ADDISON S.	1971
HOCH, EMIL H.	1969
HODGSON, PAUL M.	1965
HOLLOWAY, LEWIS D.	1967
HOLMES, LONNIE A.	1971
HOLTROP, WILLIAM F.	1948
HOMISAK, WILLIAM	1970
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
HOPPER, CHARLES H.	1971
HORBAKE, R. LEE	1942
HORNBLAKE, R. LEE	1939
HOSTETLER, IVAN	1945
HOUSKA, JOSEPH T.	1971
HOWE, TREVOR G.	1963
HULL, THOMAS F.	1964
HUNT, DE WITT T.	1939
HUNTINGTON, HAROLD A	1940
HUSS, WILLIAM E.	1951
HUTCHERSON, ETHEL M.	1966
HUXOL, ROBERT L.	1954
HYDER, CARROLL R.	1971
INGRAM, FRANKLIN C.	1966
ISOM, VERNON H.	1970
JABBARI, EBRAHIM G.	1972
JACKEY, DAVID F.	1933
JACOBSEN, JAMES H.	1964
JAMES, CALVIN E.	1963
JENKINS JR, JAMES	1955
JENSEN JR, ROBERT D.	1969
JENSEN, THOMAS R.	1968
JOHNSON, DUANE A.	1972
JOHNSON, MARVIN E.	1959
JOHNSON, RAYMOND C.	1971
JONES, CHARLES I.	1967
JORDAN, THOMAS F.	1942
JUANG, HWAI-I	1972
JUDD, WILLIAM P.	1971
JULIAN, LESTER J.	1953
KABAKJIAN, EDWARD	1969
KAGY, FREDERICK D.	1959
KEIM, WILLIAM E.	1966
KEITH, CHARLES W.	1964
KEPLER, ATLEE C.	1968
KERWOOD, ROBERT V.	1967
KETCHAM, GEORGE W.	1963
KHOSHZAMIR, FIROUZ	1971
KIMBALL, KENNETH R.	1967
KJOS, OSCAR E.	1954
KLABENES, ROBERT E.	1971
KLEINBACH, MERLIN H.	1959
KLEINTJES, PAUL L.	1953
KOCH JR, CARL	1972
KOHLER, RODERICK G.	1952
KOO, PO-YEN	1968
KOONCE, TOMMY R.	1968
KRUMBIEGEL, WALTER O	1955
KU, GEORGE C.	1973
KURTZ, HARMON H.	1959
LAND, MING H.	1970
LANG, EDWARD H.	1942
LANGDON, CHARLES W.	1967
LANGFORD, AL G.	1969
LAPPIN, ALVIN R.	1958
LARSON, MILTON E.	1965
LAUBENTHAL, CRAIG D.	1969
LEMONS, CLIFTON D.	1965
LIGHT, KENNETH F.	1967
LINDAU, ORA F.	1968
LLOYD, CLIFFORD J.	1968
LOATS, HENRY A.	1950
LOCKETTE, RUTHERFORD	1956
LOGUE, JAY L.	1959
LOPEZ, DANIEL C.	19
LUETKEMEYER, JOSEPH	1961
MALEY, DONALD	1949
MANSFIELD, ROBERT T.	1959
MARBURGER, EDWARD F.	1948
MARCH, BRYCE D.	1961
MARTIN, WILLIAM E.	1970
MASON, EMMETT E.	1969
MASON, WILLIAM H.	1970
MASSEY, HAL	1965
MC CLEARY, JOSEPH L.	1967
MC CRORIE, THOMAS R.	1952
MC DOUGLE, LARRY G.	1971
MC ELHENY, JOHN R.	1960
MC INNIS, DONALD W.	1971
MC KECHNIE, GRAEME H	1966
MC LONEY WIRT L.	1965
MC NEILL, JOSEPH G.	1970
MEHAIL, SPIRO	1971
MEHALLIS, GEORGE	1963
MEIER, MARY A.	1969
MEISNER, ROBERT G.	1967
MELLINGER, BARRY L.	1972
METZLER, JOHN H.	1970
MEYERS, ALBERT	1967
MICHELSON, EINO S.	1956
MILAM, THOMAS R.	1968
MILLER, JACK D.	1971
MILLER, JAMES A.	1971
MILLER, LARRY R.	1971
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MILLER, MURRAY L.	1947
MILLS, EARL S.	1971
MILLS, EARL S.	1971
MITCHELL, JOHN	1954
MONTELLO, PAUL A.	1968
MORELAND JR, HENRY C	1970
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MORGAN, DARYLE W.	1968
NAIR, RALPH K.	1950
NEALIS, MICHAEL F.	1951
NEFF, WILLIAM L.	1941
NEWBURY, DAVID N.	1967
NEWKIRK, LOUIS V.	1929
NIELSEN, ERWIN E.	1969
O DELL, ROBERT D.	1963
O NEIL, IVOR R.	1972
OAKLEY, HUGH L.	1954
OGLE, LEWIS W.	1971
OHLSON, ELI E.	1943
OLIVO, C. THOMAS	1954
OLSEN, FRED A.	1962
OTTERSON, PEDER A.	1969
OXLEY, VINCENT E.	1969
PANKOWSKI, DALLAS J.	1966
PATTERSON JR, PHILIP	1968
PATTERSON, JOHN R.	1970
PAWELEK, STANLEY J.	1941
PAYZER, MARVIN F.	1954
PEIFFER JR, HERBERT	1939
PENDERED, NORMAN C.	1951
PERSHING, REX W.	1970
PETER, RICHARD F.	1970
PETERS, DONALD F.	1959
PHALLEN, CHARLES W.	1958
PHARES, GAIL J.	1962
PHILLIPS JR, MILTON	1967
POLESZAK, LEONARD J.	1969
POLOMSKY, JOHN V.	1969
PORTER, SAM R.	1962
PRATT, ARDEN L.	1968
PRATZNER, FRANK C.	1969
PRICE, DENNIS H.	1955
PROCTOR, BERNARD S.	1950
QUIER, GEORGE T.	1969
RANDEL, STEPHEN V.	1957
RAPP, ALFRED V.	1972
REED, HOWARD O.	1948
REED, HOWARD O.	1948
REESE, ROBERT M.	1954
REID, DEMPSEY E.	1956
RICE JR, JOSEPH A.	1971
RICHARDS, JOHN V.	1970
RIDLEY JR, WILLIAM H	1970
RILEY, E. C.	1970
RIMLER, GEORGE W.	1969

RINEHART, RICHARD L.	1966
ROBERTSON JR, LUTHER	1970
ROBINSON, WILLIAM O.	1971
ROEDER, JOHN A.	1972
RONODIDJOJO, SOEWAN	1968
ROSS, HERBERT J.	1970
ROTHMAN, ROBERT A.	1969
RUBIN, MORRIS M.	1950
RUDISILL, ALVIN E.	1969
RUNNALLS, JAMES J.	1965
RUSSELL, LESTER F.	1968
SARGENT, WILLIAM T.	1956
SCHANK, KENNETH L.	1965
SCHMIDT JR, FRED J.	1941
SCHWEINFURTH, LUDWIG	1969
SEIDEL, JOHN J.	1951
SELLON, WILLIAM A.	1950
SELMAN, JAMES W.	1967
SEXTON, WILLIAM E.	1965
SHAFER, CARL I.	1961
SHEFFIECK JR, CHARLE	1969
SHELL, LON R.	1971
SHEPPARD, LAWRENCE E	1967
SHERMAN, DOUGLAS R.	1956
SHIBLES, FOSTER M.	1971
SHIGETOMI, SAMSON S.	1970
SHOEMAKER, BYRL R.	1957
SHULL, HOWARD I.	1969
SILVER, HARVEY A.	1967
SIMONS, JEROLD J.	1967
SINGLETARY, THOMAS A	1968
SMITH, FARMER S.	1969
SNYDER, VANCE B.	1960
SOMMERFELD, DONALD A	1969
SONDERMAN, ROBERT B.	1956
SONNER, JAN R.	1972
SONNY, JACOB	1971
SPEER, HUGH W.	1950
SPENCER, ALBERT G.	1969
SQUIBB, ALBERT R.	1967
STANGER, NORMAN R.	1967
STANGL, OTTO A.	1968
STANTON, WILLIAM A.	1967
STENSON, ORVIS J.	1971
STEPHENSON, LESLIE E	1958
STERN, JACOB	1964
STONER, WILLIAM D.	1940
STORMER, DONALD L.	1967
STOUGHTON, ROBERT W.	1955
STRICKLAND, THOMAS W	1959
STUART, CHIPMAN G.	1968
STUART, HARLAND	1933
STUART, WILLIAM R.	1972
STUESSY, EUGENE L.	1969
SULLIVAN, JAMES A.	1967
SUNDIN, ROBERT L.	1971
SWAENGSUGDI, THANOO	1959
TAGGART, LEO R.	1953
TALKINGTON, JOE E.	1962
TAYLOR, CYRUS B.	1955
THOMPSON, BRUCE L.	1971
THROWER, ROBERT G.	1961
TILLEY, TRUMAN E.	1945
TIMPER, HANS E.	1972
TOBIN, GERALD W.	1972
TOWERS, EDWARD R.	1956
TREGILGUS, EARL P.	1954
TRICHE JR, ANDREW	1933
TURNER, ALFRED B.	1941
TUTTLE, CHESTER D.	1965
UBELACKER, SANDRA D.	1971
ULLERY, JESSE W.	1971
UNDERHILL, CHARLES M	1968
USDANE, WILLIAM M.	1955
VALENTINE, IVAN E.	1969
VANDIVER, ROBERT E.	1968
VERMEULEN, ROBERT	1968
VINEYARD, BENNY S.	1962
VOELKNER, ALVIN R.	1970
WAHTERA, KAUKO A.	1965
WAKITA, OSAMU A.	1970
WALL, EDWARD R.	1972
WALL, GUSTAVE S.	1951
WALLACE, NORMAN E.	1968
WALLIS, CARL R.	1969
WALLIS, DONALD E.	1965
WALLS, W. DALE	1964
WALSH, RAYMOND J.	1965
WARRICK, GLENN D.	19
WASDEN, JED W.	1968
WASHBURN, CLYDE I.	1969
WEAGRAFF, PATRICK J.	1971
WEBER, ROBERT D.	1971
WEBSTER, JAY L.	1970
WEBSTER, JAY L.	1970
WEINER, DONALD A.	1971
WEIR, ELDON L.	1970
WELCH, FREDERICK G.	1971
WELSH, DONALD J.	1968
WENIG, ROBERT E.	1970
WENTZ, CHARLES H.	1969
WHITE, STROLLER T.	1967
WHITESEL, JOHN A.	1940
WIEHE, THEODORE E.	1954
WIGGS, GARLAND D.	1971
WILBER, GEORGE O.	1941
WILCOX, T. GLADE	1957
WILLIAMS, WILLIAM A.	1959
WILLIAMSON, MERRILL	1958
WILSON, MICHAEL C.	1969
WILSON, RUSSELL C.	1971
WINTERS, KENNETH W.	1970
WOFFORD, THOMAS B.	1963
WOMMACK, CHARLES H.	1967
WOODRUFF, JAMES N.	1971
WORTHINGTON, ROBERT	1953
WRIGHT, JERAULD B.	1969
WRIGHT, RONALD T.	1971
WRIGHT, WELCOME E.	1953
YOUNG, DARIUS R.	1968
ZANE, LAWRENCE F.	1968

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AUTHOR	DATE
BECKER, DEROLD W.	1969
BIES, JOHN D.	1972
BYROM, JOHN M.	1957
CLAWSON, LA VERE E.	1967
COMSTOCK, THOMAS W.	1969
CRAWFORD, JOHN E.	1941
DENSLEY, KENNETH G.	1967
DOUCETTE, RUSSELL J.	1972
DRAKE, JAMES B.	1972
FLUEGGE, LYNN R.	1972
FOLEY JR, JOHN P.	1968
FRAGALE, MARVIN J.	1969
FULLER, JOHN A.	1971
FUZAK, JOHN A.	1948
FUZAK, JOHN A.	1954
GARNER, CAREY C.	1969
GIFFORD, KENNETH K.	1970
GISRIEL, AUSTIN E.	1959
GOLDMAN, ROBERT C.	1971
GRANDCHAMP, ROBERT J	1971
GRANEY, MAURICE R.	1942
GRIESENBROCK JR, HER	1955
HALE, LESTER W.	1967
HAMMER, GARLAND G.	1951
HANKIN, EDWARD K.	1947
HANSBURG, HENRY	1935
HANSON, DURWIN M.	1956
HARLAN, OWEN	1953
HARRIS, ROBERT C.	1970
HAWKINS, LESLIE V.	1953
HAWLK, ROBERT H.	1960

HEGGEN, JAMES R.	1967
HENNIG, JAMES F.	1970
HERRICK, IRVING W.	1969
HILTON, ROSS C.	1970
HISER, PAUL T.	1958
HOLM, MELVIN G.	1972
HULLMAN, DON H.	1971
IRVINE, FLEET R.	1968
JARVIS, JOHN A.	1953
JENKINS, FARRELL T.	1969
JENSEN JR, ROBERT D.	1969
JOHNSON, DONALD H.	1966
KESEMAN, CHARLES E.	1967
KRUBECK, FLOYD E.	1954
KUETEMEYER, VINCENT	1972
LATHROP, ROBERT C.	1969
LE BLANC, DARRELL R.	1971
LEMONS, CLIFTON D.	1965
LINHARDT, RICHARD E.	1971
LINNICK, IDA	1949
LOWENSTEIN, NORMAN	1955
LOWMAN, CLARENCE L.	1967
LUTZ, RONALD J.	1969
LYONS, RICHARD A.	1969
MANNION, EDMUND J.	1972
MC CALLUM, HARRY N.	1967
MC EOWEN, ROBERT H.	1967
MC KECHNIE, GRAEME H	1966
MILNOR, BRENT T.	1971
MORRIS, ALLEN E.	1971
MORRISON, JESSIE S.	1969
MUDGETT, ALBERT G.	1958
MULLER, ERWIN T.	1938
NASH, MC KINLEY M.	1972
NELSON, HOWARD F.	1953
NEUFELD, JACOB A.	1968
ODBERT, JOHN T.	1973
PASSMORE, JAMES L.	1968
PATTERSON, JOHN R.	1970
PEERSON, RICHARD H.	1969
PHILLIPS, DONALD S.	1968
PLATA, MACIMINO	1971
PRITCHARD, MIRIAM C.	1937
PUFFER, KAREL	1971
PUGH, DWIGHT A.	1969
REISENGER, RAYMOND H	1970
ROLLINGS, JAMES W.	1967
SALTEN, DAVID G.	1944
SANDERSON, HERBERT	1948
SELLON, WILLIAM A.	1950
SHEMICK, JOHN M.	1960
SHIH, WEI-TUN	1969
SIEVERT, NORMAN W.	1971
SILVEY, WRAY D.	1950
SLAPER, FRANK M.	1972
SMITH, BRANDON B.	1968
SMITH, ROBERT E.	1928
SONNER, JAN R.	1972
STANFIELD, FOSTER A.	1971
STANTON, MILDRED B.	1938
STOUGHTON, ROBERT W.	1955
SULLIVAN, THOMAS W.	1967
SUNDIN, ROBERT L.	1971
TERRY, THOMAS P.	1972
THORPE, CLAIBURNE B.	1968
TORRES, LEONARD	1963
TUCKER, CASEY A.	1965
ULLERY, JESSE W.	1971
VON STROH, GORDON E.	1968
WALDORF, ROBERT J.	1971
WHINFIELD, RICHARD W	1969
WILMOTT, JOHN N.	1941
WINDLE, JIM L.	1968
WINNICK, ANDREW J.	1971
WYNNE, ROBERT L.	1968
ZIMMER, THEODORE A.	1969

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AUTHOR	DATE
ANDERSON, EDWARD T.	1970
BAUGRUD, KIM J.	1968
BEDWELL, NORMAN W.	1951
BENDER, MICHAEL	1971
BENJAMIN, GERALD E.	1968
BLACK, DONALD E.	1970
BLAND, LARSON M.	1972
BURRIS, WAITUS R.	1967
CLARK, JAMES V.	1967
DAVIS, EDDIE M.	1971
DAVIS, EDDIE M.	1971
DOANE, RAYMOND C.	1956
DRENNAN, JERRY D.	1970
ELMER, FRANCES W.	1967
FINDLEY, WILLIAM L.	1967
FRAZIER, WILLIAM D.	1966
GALLOWAY, JOEL D.	1972
GILL, ROY C.	1972
GLENN, JOHN W.	1966
GLISMANN, LEONARD W.	1967
GROVES, RAMSEY M.	1966
HAGEN, DONALD L.	1972
HALLAHAN, MICHAEL F.	1969
HOLLINSHEAD, MERRILL	1952
JACKMAN, DUANE A.	1961
JAGEMAN, LARRY W.	1968
JENSEN, THOMAS R.	1968
LOVELESS, AUSTIN G.	1962
LUY, JACK A.	1964
MANNION, EDMUND J.	1972
MOORE, ALFRED H.	1954
NILSON, KENNETH	1931
NOTHDURFT, MARIE E.	1972
O BRYANT, DAVID C.	1970
OAKS, MERRILL M.	1970
OLSON, DAVID O.	1969
PRITCHARD, MIRIAM C.	1937
RICH, MILDRED K.	1958
ROSS, HERBERT J.	1970
SEEHOFF, JESSE	1942
TURECHEK, ARMIN G.	1967
WENTZ, CHARLES H.	1969
WILBUR, LOUISE	1931
WILLIAMS, MICHAEL	1970
WOLLINGTON, JAMES M.	1966

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AUTHOR	DATE
JACKSON, PETER A.	1965
KIMBALL, KENNETH R.	1967
MAYS, WILLIAM A.	1954

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ABITIA, FREDDIE	1971
ABITIA, FREDDIE	1971
ALEXANDER, WILLIAM F	1969
ALSUP, REA T.	1967
AMTHOR, WILLIAM D.	1967
ARMSTRONG, WILLIAM H	1967
ARVEY, RICHARD D.	1970
AUER, HERBERT J.	1971
BABCOCK, JAMES G.	1969
BAKER, NORMAN A.	1971
BALZER, EUGENE W.	1972
BARLOW, GARY C.	1967
BASS, RONALD E.	1971
BAUGHER, RICHARD W.	1972
BECK, EUGENE J.	1968
BECKHAM, JOE W.	1969
BENDER, MICHAEL	1971
BERGMAN, KENNETH H.	1963
BERTRAND, CLINT A.	1964
BIEKERT, RUSSELL G.	1971
BIENALD, EDWARD C.	1969
BJORKQUIST, DAVID C.	1965
BJORNERUD, JAMES A.	1970
BLAND, LARSON M.	1972
BLANKENBAKER, EDWIN	1970
BLOMGREN, ROGER D.	1962
BOUTWELL JR, COLEN J	1971
BRENNER, CHARLES J.	1968
BROOKS, WESTON T.	1964
BURSE SR, LUTHER	1969
CALEY, PAUL C.	1969
CAMPBELL, GORDON	1969
CAMPION, HOWARD A.	1941
CARLSON, HENRY L.	1967
CHASTAIN, GARY K.	1972
CLARK, DONALD L.	1967
COCHRAN, GEORGE C.	1967
COOMER, JERRY W.	1971
COOVER, SHRIVER L.	1941
CORNWELL, RAYMOND L.	1961
CRAFT, CLYDE O.	1967
CREMER, KENNETH D.	1970
CROWDER, GENE A.	1968
DE OLD, ALAN R.	1971
DENNIS, ERVIN A.	1966
DOUGHERTY, DORA J.	1955
DUGGER, WILLIAM E.	1970
EARLE, JAMES H.	1964
EASTON, CLIFFORD W.	1971
ELLIS, NEIL G.	1966
ENTORF, JOHN F.	1967
ETHIRVEERASINGAM, NA	1971
FACE, WESLEY L.	1963
FAZZINI, PHILLIP A.	1970
FOWLER, EWELL W.	1949
FOWLER, RICHARD J.	1965
FRANCHAK, STEPHEN J.	1971
FRANCHAK, STEPHEN J.	1971
FRANCIS, GEORGE H.	1966
FROELICH, DONALD M.	1970
GALE, STEVE	1954
GALLINELLI, JOHN W.	1970
GEDEON, DAVID V.	1971
GERNE JR, TIMOTHY A.	1967
GETTLE, KARL E.	1970
GIERKE, EARL W.	1970
GLAZENER, EVERETT R.	1958
GOFF, WILLIAM H.	1967
GRIFFITH, JOHN L.	1967
HACKLER, CLYDE M.	1971
HAHN, MARSHALL S.	1967
HAILES, CHARLES W.	1971
HANKIN, EDWARD K.	1947

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HARDING, LARRY G.	1971
HASKELL, ROGER W.	1969
HEARN, ARTHUR R.	1948
HENAK, RICHARD M.	1971
HEPLER, EARL R.	1957
HERBERTS, ROGER E.	1971
HESS, HARRY L.	1969
HEYEL, CLARENCE L.	1967
HILL, CLAIR S.	1971
HINCKLEY, EDWIN C.	1963
HOCH, EMIL H.	1969
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HOLT, IVIN L.	1972
HOLT, JAY E.	1970
HORBAKE, R. LEE	1942
HOUSEHOLDER, DANIEL	1963
HOUSKA, JOSEPH T.	1971
HUDSON, DONALD W.	1972
HULL, THOMAS E.	1964
HURLEY, CARL E.	1971
ILOTT, JOHN F. D.	1969
ISRAEL, EVERETT N.	1972
JACOBSEN, ECKHART A.	1957
JANECZKO, ROBERT J.	1971
JARED, ALVA H.	1968
JENKINS, JOHN D.	1969
JOHNSON, FRANK F.	1971
JOHNSTON, JOHN L.	1956
JOLLY, FRANK H.	1970
JONES, GARY H.	1969
KAUMEHIEWA, ALSON I.	1969
KIEFT, LEWIS D.	1970
KOBLE, RONALD L.	1963
KRUPPA, JOHN R.	1968
KRUPPA, RICHARD A.	1970
KUWIK, PAUL D.	1970
LACROIX, WILLIAM J.	1971
LANDECKER, LOUIS	1969
LANDERS, JACK M.	1972
LARUE, JAMES P.	1968
LAWSON, TOM E.	1973
LEASE, ALFRED A.	1964
LEMASTER, LELAN K.	1961
LEVANDE, JAMES S.	1972
LINDAHL, LAWRENCE G.	1944
LINDEMEYER, RAY S.	1954
LINNICK, IDA	1949
LONDON, HOYT H.	1934
LUCK, WILLIAM E.	1966
LUETKEMEYER, JOSEPH	1961
MANCHAK, PAUL J.	1965
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MC CAGE, RONALD D.	1970
MC CAGE, RONALD D.	1970
MC MURRY, JAMES G.	1964
MEERS, GARY D.	1972
MILLER JR, FRANK M.	1971
MILLER, CLARENCE M.	1968
MOEGENBURG, LOUIS A.	1969
MORRILL, DAVID	1970
MORRIS, ALLEN E.	1971
MOSS JR, JEROME	1960
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NEVITT, THOMAS A.	1966
NEWTON, ROBERT E.	1970
NORMAN, RALPH P.	1955
NORTON, ROBERT E.	1967
OLSON, DAVID O.	1969
PAINE, OLIVE	1930
PEARSON, WILLIAM W.	1967

AUTHOR	DATE
PHILLIPS, THOMAS G.	1971
PIERSALL, ARNOLD C.	1964
PORTER, CHARLES B.	1957
POUCHER, KENNETH E.	1968
PRITCHARD, MIRIAM C.	1937
PUCEL, DAVID J.	1966
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
REMICK, EDWARD L.	
REPP, VICTOR E.	1970
RICHARDS, KENVYN B.	1970
RICHARDS, MAURICE F.	1950
RICKER, PHILLIP E.	1965
RILEY, JOHN N.	1972
ROBERSON, ROY P.	1967
ROKUSEK, H. J.	1964
ROLLINGS, JAMES W.	1967
ROUTH, JERRY D.	1970
ROWLETT, JOHN D.	1960
ROY, WENDELL L.	1963
RUEHL, PHILIP W.	1961
RUGGLES, STANFORD D.	1969
RUTTER, WILLIAM W.	1971
RUMMELL, WINFIELD R.	1971
RUSSELL JR, JAMES A.	1967
SAGE, JAMES E.	1971
SCHACHT, ROBERT C.	1971
SEAL, MICHAEL R.	1969
SHULL, HOWARD I.	1969
SMITH, FREDDY J.	1970
SMITH, ROYAL E.	1969
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
SOMMERS, WESLEY S.	1961
SPENCE, WILLIAM P.	1957
ST JOHN, DAVID R.	1971
STAMBOOLIAN JR, JOHN	1972
STANFIELD, FOSTER A.	1971
STEELE, GERALD L.	1967
STELZNER, RAYMOND R.	1969
STIEGLER, LAIRD B.	1971
STUESSY, EUGENE L.	1969
SUESS, ALAN R.	1962
SULLIVAN, FRANK V.	1964
SULLIVAN, JAMES A.	1967
SUMTER, PAUL E.	1969
TOMLINSON, ROBERT M.	1962
TRAUTWEIN, CALVIN L.	1962
VANN, LOWELL C.	1970
VOELKNER, ALVIN R.	1970
WAISNER, GARY L.	1970
WAISNER, GARY L.	1970
WALGREN, FLOYD B.	1971
WALKER, JOE W.	1970
WARREN, WILLIAM H.	1970
WARZECHA, EVERETT R.	1972
WEFFENSTETTE, WALTER	1965
WEIR, ELDON L.	1970
WHITE, CONRAD L.	1970
WILKES, DORAN F.	1966
WILLEMS, ALVIN E.	1970
WILLS, VERNON L.	1965
WILSON, RUSSELL C.	1971
WISEMAN, EMORY E.	1969
WORTHINGTON, ROBERT	1958
WRIGHT, WELCOME E.	1953
YEAGER, LOWERY D.	1965

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ASHCRAFT, NORMAN C.	1968
BATESON, WILLARD M.	1954
BESTOR, ROLLIE R.	1969
BOLLINGER, ELROY W.	1950
BROWN, GEORGE J.	1960
CHRISTIAN, JACK B.	1969
DEAN, ERNEST D.	1968
DITLOW, GEORGE H.	1956
DOUCETTE, RUSSELL J.	1972
ENGLISH, ROBERT W.	1950
FINCH, CURTIS R.	1969
GRADWELL, JOHN B.	1971
HANSEN, RICHARD H.	1967
KELLY, WILLIAM T.	1966
KIST, KEVIN W.	1970
KLEHM, WALTER A.	1937
MARTIN, DONALD H.	1971
MC GAW, SIDNEY E.	1952
MONROE, ALLEN L.	1970
MOON, DONALD E.	1968
MORRISEY, THOMAS J.	1965
PAGE, CHARLES B.	1953
PERKINS, NEAL B.	1962
ROSS, RAYMOND J.	1966
RUDISILL, ALVIN E.	1969
SCHMIDT JR, FRED J.	1941
SHELL, LON R.	1971
SMITH, IRVING G.	1969
STANGL, OTTO A.	1968
TRAPANESE, MENNA G.	1964
UXER, JOHN E.	1967
VAN DYKE, ARVID W.	1970
VOLPE, GERALD	1969
WINEGAR, GARY H.	1969
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CONROY JR, WILLIAM G	1969
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AUSTIN, ROBERT T.	1964
BARLOW, GENE A.	1971
BASKIN, SAMUEL	1954
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BRITT, ROBERT D.	1966
CROUCH, J. PAGE	1968
DALTON, FRANCIS W.	1937
DANAHER, EUGENE I.	1946
DANAHER, EUGENE I.	1946
DYKEHOUSE, JAY	1950
ELLIS, MARY L.	1970
FORBES, ROY H.	1970
FORKNER, HAMDEN L.	1939
GILBERT, PAUL S.	1972
GILMAN, ROBERT A.	1969
GLAU, JON E.	1970
GRELL, DARRELL D.	1967
GRUBER, HERBERT H.	1942
HANSEN, GARY B.	1971
HARRISON JR, RUSSELL	1971
HUNTER, ELVIN M.	1963
IACOBELLI, JOHN L.	1969
JOCHEN, ALBERT E.	1947
JUANG, HWAI-I	1972
KING, HOMER P.	1934
KOEHLER, MYRON	1972
LANGDON, CHARLES W.	1967
LIGHT, KENNETH F.	1967
MATTSON, HOMER A.	1970
MC CLELLAN, LARRY D.	1971
MC NAMARA, JAMES F.	1970
MEISNER, ROBERT G.	1967
MONEY, HOMER E.	1956
MORGAN JR, ALFRED D.	1967
MORGAN, JACK W.	1951
NEFF, WILLIAM L.	1941
NEFF, WILLIAM L.	1941
PATTERSON JR, PHILIP	1968
PENN, THOMAS L.	1968
PIERCE, WILLIAM F.	1967
PRATT, ARDEN L.	1968
SHUNN, DONALD W.	1972
SWAENGSUGDI, THANOO	1959
TAYLOR, FRANK C.	1970
VANDER LINDE, ALBERT	1971
VANDERWELL, ALLEN R.	1971
VANDIVER, ROBERT E.	1968

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AUTHOR	DATE
CHRISMAN, JOSEPH P.	1970
CUSHING, NELSON N.	1971
DENNISON, BOBBY	1970
HAILES, CHARLES W.	1971
KRUPPA, JOHN R.	1968
LEMASTER, LELAN K.	1961
LUNDY, LYNDALL L.	1968
MC CAGE, RONALD D.	1970
MORRILL, DAVID	1970
NEWTON, ROBERT E.	1970
SCHOESLER, RONALD D.	1971
SOMMER, SEYMOUR A.	1971
THATCHER, GLENN M.	1970
WILKES, DORAN F.	1966
WOLFE, JAMES M.	1970

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AUTHOR	DATE
ALDRICH III, DANIEL	1972
ALDRICH, TERRY M.	1969
ANDERSON, ERNEST F.	1966
BARLOW, GENE A.	1971
BARRINGER, DEAN	1971
BENJAMIN, NEAL B.	1969
BUNTEN, CHARLES A.	1955
BURGETT, DONALD C.	1970
CAGE, BOBBY N.	1968
COATES, NORMAN	1967
CORAZZINI, ARTHUR J.	1967
CORFIAS, JOHN C.	1967
EPSTEIN, JACK H.	1971
FINDLEY, WILLIAM L.	1967
FORGEY, GEORGE W.	1971
FOWLER, HARMON R.	1970
GARRETT, ARTHUR M.	1971
GIBSON, CHARLES H.	1968
GOISHI, FRANK H.	1970
GRAMBERG, MERLYN L.	1971
GRUBER, HERBERT H.	1942
HANSEN, JOHN R.	1970
HARRIS, JAMES G.	1970
HEATH, JAMES L.	1967
JOHNSON, RAYMOND C.	1971
JURKOWITZ, EUGENE L.	1968
KOCH, NORBERT	1951
LOVELESS, AUSTIN G.	1962
MC NAMARA, JAMES F.	1970
MILLER, JOHN G.	1954
OLSEN, EUGENE A.	1968
PARKES, GEORGE H.	1939
PARKS, GERALD A.	1969
PARRY, ERNEST B.	1968
PATTERSON JR, PHILIP	1968
PENDERED, NORMAN C.	1951
PENN, THOMAS L.	1968
POWELL, PAUL E.	1954
RAICHLE, HENRY F.	1969
ROBERTSON, LYLE R.	1968
SHELTON, JOHN A.	1968
SLATTERY, RAYMOND A.	1969
ZWEIBEL, MALCOLM C.	1968

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HOGHAUG, HAROLD T.	1971
MUNGER, PAUL R.	1972
WEATHERS, RICHARD D.	1972
WOLANSKY, WILLIAM D.	1968

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AUTHOR	DATE
ABDULLABI, BAKRI	1971
AKHUN, ILHAN I.	1961
AL-BUKHARI, NAJATI M	1968
ALAKI, MADANI A.	1972
ALKAN, OMER C.	1969
ARMSTRONG, JAMES A.	1968
AUSTIN, ROBERT T.	1964
BLECKMAN, JUDITH C.	1971
BOHN, RALPH C.	1957
BRAUN, CHARLES A.	1970
BRILEY, FRANK E.	1967
CHARCONCHAI, RUANG	1963
COATES, NORMAN	1967
DANIELS, BLAIR E.	1937
DINGMAN, ERWIN	1949
EVANS, HARRY L.	1953
FARAHBAKHSHIAN, EBRA	1967
GILMAN, ROBERT A.	1969
HANSEN, GARY B.	1971
HANSSON, KENNETH S.	1966
HARRIS, SUE A.	1970
HOLTROP, WILLIAM F.	1948
HOSLER, FRED W.	1938
ILLINIK, ROBERT L.	1971
JABBARI, EBRAHIM G.	1972
KHOSHZAMIR, FIROUZ	1971
KINI, KULAI H.	1933
KOO, PO-YEN	1968
KRAFT, RICHARD H.	1967
MAGENDZO, ABRAHAM	1969
MC ELHENY, JOHN R.	1960
MOHEE, N. F.	1968
NEE, NELSEN V.	1971
ROBINSON, JAMES W.	1967
RONODIDIJOJO, SOEWAN	1968
SADA, PABLO M.	1971
SHANTHAMALLAPPA, B.	1950
SHARMA, BALDEV R.	1967
SOLIMAN, ABDEL RAZEK	1970
STRUCK, JOHN W.	1956
STUART, HARLAND	1933
SWAENGSUGDI, THANOO	1959
TAYLOR, FRANK C.	1970
URGELL, FRANCISCO C.	1941
USDANE, WILLIAM M.	1955
VYAS, PREMILA H.	1967
WARDWELL, WAYNE D.	1950
WIJEYEWARDENE, JALUT	1960
ZAREISN, SOLEIMAN	1969

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AUTHOR	DATE
HASH, JOHN A.	1969

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AUTHOR	DATE
BAILEY, GERALD D.	1964
BRILEY, FRANK E.	1967
HAUSER, ROGER E.	1971
LITTLE, RICHARD L.	1968

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AUTHOR	DATE
ADAMS, MAYNARD F.	1971
AKHUN, ILHAN I.	1961
ANDRE, NEVIN E.	1964
BAILEY, DONALD A.	1970
BAILEY, DONALD A.	1970
BALLO, GARY R.	1971
BEDWELL, NORMAN W.	1951
BENJAMIN, GERALD E.	1968
BENSMAN, CHARLES J.	1969
BOSTROM, EDWIN O.	1971
BOWSER, JAMES A.	1960
BRIGHAM, ELDEN L.	1950
BROWN, B. WESLEY	1960
BURRIS, WAITUS R.	1967
COX, STEVEN G.	1968
DARM, ADAM E.	1971
DAVIDSON, JOHN E.	1968
ERWIN, WILLIAM R.	1963
FINDLEY, WILLIAM L.	1967
FRYE, RONALD M.	1962
FULLER, FOSTER D.	
FULLER, JOHN A.	1971
GARNER, CAREY C.	1969
GRELL, DARRELL D.	1967
GROSS, ANDREW C.	1968
HAKANSON, JOHN W.	1967
HALES, JAMES A.	1972
HATALSAN, JOHN W.	1963
HEIN, EDWARD C.	1969
HEMLER, HERMAN T.	1972
HILL, FREDERICK W.	1942
HOLMES, LONNIE A.	1971
HORINE, JOHN W.	1961
HOWE, TREVOR G.	1963
JARVIS, JOHN A.	1953
JOHNSON, THOMAS P.	1967
KEIL, RAYMOND L.	1966
KLATT, LAWRENCE A.	1967
KRAFT, RICHARD H.	1967
LEMLEY, JOE W.	1970
LEONARD, REGIS L.	1950
LINDAU, ORA F.	1968
LOGUE, JAY L.	1959
MALKAN, JEROME M.	1967
MATTESON, GERALD R.	1966
MC CALLUM, HARRY N.	1967
MICHIE, JACK	1968
MILAM, THOMAS R.	1968
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MOSS, JOHN E.	1962
NELSON, A. FRANK	1955
O BRYANT, DAVID C.	1970
PAUTLER, ALBERT J.	1967
PLUSCH, JAMES O.	1967
QUICK, OTHO J.	1954
RAMP, WAYNE S.	1956
ROBERTS, EDWARD R.	1971
ROBINSON, CLARENCE L	1972
ROBINSON, ORIN R.	1965
SHACKELFORD, RICHARD	
SONNER, JAN R.	1972
SPENCER, ALBERT G.	1969
STROUT, GEORGE M.	1970
SUNDIN, ROBERT L.	1971
TOSH, DONALD J.	1971
TROOBOFF, BENJAMIN M	1968
TUTTLE, CHESTER D.	1965
VOLK, VINCENT A.	1955
WALLS, W. DALE	1964
WATKINS, KENNETH E.	1966
WELSH, DONALD J.	1968

AUTHOR	DATE
WEST, WILLIAM E.	1969
WHITE, ALVIN M.	1958
WIED, ALEXANDER F.	1972
WIEHE, THEODORE E.	1954
WILLIAMS, MICHAEL	1970
WILSON, WADE	1954
WYSOCK, RAYMOND A.	1972
ZANE, LAWRENCE F.	1968

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AUTHOR	DATE
GERBER, RUSSELL L.	1966
KAISER, HAROLD F.	1968
NEUBAUER, GERHARDT W	1956
SCHENCK, JOHN P.	1969

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AUTHOR	DATE
ACKER, JAMES D.	1971
BAKER, GLENN S.	1968
BARRINGER, DEAN	1971
BEARDEN, WILLIAM W.	1967
BLISS, WILLIAM H.	1953
BRASTED, F. KENNETH	1953
BUDKE, WESLEY E.	1970
CANDOLI, I. C.	1967
COHEN, CHESTER G.	1970
COMBS, STANLEY L.	1948
CRAWFORD JR, BRYANT	1961
DANOVITZ, SAUL	1957
DAVIS, EDDIE M.	1971
DITTENHAFER, CLARENC	1972
DOLEZAL, WILMA M.	1968
EATON, MERRILL T.	1932
ENGELBREKTSON, SUNE	1961
EVANS, WILSON A.	1954
FAGAN, RAYMOND E. B.	1954
FALES, ROY G.	1948
FARR, WILBUR J.	1958
GEARING, PHILLIP	1970
GILBREATH, TOMMY D.	1971
GILLILAND SR, LONNIE	1955
GLENN, JOHN W.	1966
GRONEMAN, CHRIS	1950
HALL, CLARENCE E.	1969
HANSSON, KENNETH S.	1966
HAWKINS, LESLIE V.	1953
HAWLK, ROBERT H.	1960
HEEP, RICHARD H.	1939
HEMLER, HERMAN T.	1972
HENDRIX, SAMUEL D.	1942
JACKSON, ROSS P.	1967
JACOBSEN, JAMES H.	1964
JENKINS, FARRELL T.	1969
JOHNSTON, KENNETH G.	1966
JORDAN, THOMAS F.	1942
JUANG, HWAI-I	1972
KEENER, CLYDE	1959
KIMBALL, KENNETH R.	1967
KJOS, OSCAR E.	1954
KOCH JR, CARL	1972
KRAFT, RICHARD H.	1967
LACROIX, WILLIAM J.	1971
LINTON, JOHN A.	1951
LOWENSTEIN, NORMAN	1955
LUDINGTON, JOHN R.	1940
MADDOX, MARION E.	1951
MASSEY, HAL	1965
MAXCY, ELLIS O.	1941
MAYS, WILLIAM A.	1954
MC KENZIE, CHARLES R	1971
MC VICKER, HOWARD E.	1970
MILLER, WAYNE E.	1969
MONROE, LYNNE C.	1939
MORGAN JR, ALFRED D.	1967
MOULLETTE, JOHN B.	1970
NESWICK, LAWRENCE G.	1971
OAKLEY, GARY D.	1970
OHLSON, ELI E.	1943
PODVIA, M. WAYNE	1972
PUGH, DWIGHT A.	1969
QUICK, OTHO J.	1954
REIMER, MILTON K.	1968
ROBERTS, NORMAN N.	1967
RUDIGER, ELMER R.	1952
SCHMITT, VICTOR A.	1953
SCHOLES, CHARLES E.	1968
SEAMAN, DON F.	1968
SEDGWICK, LORRY K.	1965
SPEER, HUGH W.	1950
SPENCER, ALBERT G.	1969
STEPHENS, ROBERT L.	1969
STUTEVILLE, CLAUDE E	1971
TATUM JR, JULIAN P.	1967
THOMAS JR, WADE F.	1957
THORPE, CLAIBURNE B.	1968
TILLEY, TRUMAN E.	1945
VERMEULEN, ROBERT	1968
WALSH, RAYMOND J.	1965
WHEELER, EDWARD A.	1965
WILLIS, GEORGE E.	1972
WILMOTT, JOHN N.	1941

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AUTHOR	DATE
BORRI, ROBERT	1942
CALLAWAY, ROLAND L.	1953
CROWDER, GENE A.	1968
DECKER, HOWARD S.	1953
ERICKSON, JOHN H.	1953
KLEINBACH, MERLIN H.	1959
MARCH, BRYCE D.	1961
MC MURRY, JAMES G.	1964
MILLER, JOHN G.	1954
MILLER, THOMAS W.	1958
MILLER, WILBUR R.	1960
MITCHELL, JOHN	1954
REMICK, EDWARD L.	
THOMPSON, ROBERT L.	1947
VAN TASSEL, RAYMOND	1948
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
ADELMAN, FRANK W.	1972
BALDWIN, THOMAS R.	1971
DEVLIN, LEON G.	1971
DEVLIN, LEON G.	1971
FEIRER, JOHN L.	1946
GIMBEL, ARMIN F.	1953
HENRY, GEORGE F.	1954
MILLS, EARL S.	1971
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970
WHEELER, EDWARD A.	1965
WIGEN, RAY A.	1957

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AUTHOR	DATE
ARONSON, NORMA	1967
BASS, RONALD E.	1971
BROWN, GEORGE C.	1963
CARLSEN, DARVEY E.	1961
COX, ROBERT L.	1970
CRAFT, CLYDE O.	1967
DE VORE, PAUL W.	1961
DEADY, JOHN J.	1970
EVERETT, GEORGE A.	1972
FECIK, JOHN T.	1970
FRANTZ JR, NEVIN R.	1967
FUEG, HENRY L.	1971
GLOGOVSKY, RONALD J.	1970
GRAY, THOMAS E.	1970
GYSLER, RANDOLPH L.	1971
HERBERTS, ROGER E.	1971
HERR, JAMES F.	1970
HOLT, JAY F.	1970
HOOTS JR, WILLIAM R.	1966
HORNBUCKLE, GARY D.	1967
JASNOSZ, THOMAS A.	1969
JENKINS, JOHN D.	1969
KEMP, WILLIAM H.	1966
LEVANDE, JAMES S.	1972
MC CAGE, RONALD D.	1970
MELINE, CHARLES W.	1965
MOREHEAD, JAMES C.	1971
MORRILL, DAVID	1970
MORRILL, DAVID	1970
MOSS JR, JEROME	1960
NICHOLS, DWIGHT W.	1955
NYSTROM, DENNIS C.	1969
PRUST, ZENAS A.	1964
PUFAHL, VIRGIL R.	1969
RAYFORD, ERWIN W.	1967
REED, RICHARD L.	1971
RICE, CHARLES M. M.	1958
RIETH, CLAUDE E.	1966
SCHOESLER, RONALD D.	1971
SCHWEINFURTH, LUDWIG	1969
SEDGWICK, LORRY K.	1965
SMITH, KENNETH T.	1972
STEGMAN, GEORGE K.	1962
STRANDBERG, C. E.	1963
SULLIVAN, FRANK V.	1964
WEIR, THOMAS S.	1955
WILSON, MICHAEL C.	1969
WOLFE, JAMES M.	1970
WOODRUFF, JAMES N.	1971
WYNN, PHILIP D.	1970
YARRINGTON, HOLLIS R	1970

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AUTHOR	DATE
ABROMAITIS, JOSEPH J	1969
AGNOR, HERBERT E.	1970
AUCKER, JOHN R.	1970
BAILEY, LARRY J.	1968
BEHM, HARLEY D.	1967
BENSON, WILLARD A.	1959
BING, KENNETH L.	1941
BLACK, RICHARD W.	1973
BLEDSOE, HARRY J.	1968
BLUM, ROBERT E.	1965
BOONE, JAMES L.	1966
BORTZ, WALTER R.	1971
BRIGHAM, ELDEN L.	1950
BRINKMAN, FRED J.	1970
BROWN, WILLIAM E.	1964
BURNS, WILLIAM E.	1965
CLAUSEN, JOHN N.	1955
CLENDENNING, LEE R.	1972
CLEVELAND, JOHN M.	1961
CLIFTON, RONALD J.	1970
CONLEY, FRANKLIN	1968
CRAWFORD, JOHN E.	1941
DEAN, C. THOMAS	1951
DENSLEY, KENNETH G.	1967
DIRKSEN, DENNIS A.	1969
DRAKE, LAWRENCE C.	1966
DRAWDY, LARRY A.	1971
DUNHAM, PHIL R.	1970
DYKE, EUGENE L.	1962
EHRENBORG, JOHN D.	1963
ELLIOTT, BURTON L.	1971
ENSMAN, LEO M.	1957
FEATHER, DON B.	1949
GIACHINO, JOSEPH W.	1949
GOFF, WILLIAM H.	1967
HALL, DAVID H.	1971
HARRIS, VIRGINIA J.	1961
HATALSAN, JOHN W.	1963
HENRY, GEORGE F.	1954
HISER, PAUL T.	1958
HOERNER, HARRY J.	1969
HOLLINSHEAD, MERRILL	1952
HOLMEN, HOLGER E.	1969
HORINE, JOHN W.	1961
JACKSON, ROSS P.	1967
JARVIS, JOHN A.	1953
JOHNSON, ROBERT O.	1968
JOHNSON, RUFUS G.	1949
JOHNSON, THOMAS P.	1967
JOHNSTON, WALLACE L.	1968
KOHL, ERNEST O.	1949
KURTZ, HARMON H.	1959
LAUBENTHAL, CRAIG D.	1969
LEAVITT, WILLIAM C.	1969
LYBARGER, ALVIN E.	
MAC DONALD, MANLEY E	1944
MARSHALL JR,THOMAS C	1941
MC CABE, FRED J.	1970
MEOSKY, PAUL R.	1967
MESSMAN, WARREN B.	1963
MILLER, L. PAUL	1939
NEUFELD, JACOB A.	1968
NIEMELA, ALBERT W.	1949
NOLL, ROBERT F.	1967
OAKLEY, HUGH L.	1954
OLSON, JERRY C.	1964
PEERSON, RICHARD H.	1969
PUFFER, KAREL	1971
RIGGS, DONALD D.	1971
RISHER, CHARLES G.	1953
ROBINSON, FRANK E.	1955
ROBINSON, ORIN R.	1965
SHORE JR, THOMAS C.	1970

SOLTYS, ROBERT G.	1971
STANTON, MILDRED B.	1938
STEPHENS, GEORGE T.	1969
STORMER, DONALD L.	1967
THOMAS JR, WADE F.	1957
TURECHEK, ARMIN G.	1967
VACEK, WILLIAM L.	1962
VAN DERSLICE, JOHN F	1967
WANGER, RUTH	1971
WATKINS, KENNETH E.	1966
WENDT, DONALD D.	1962
WERNER, WAYNE E.	1969
WILLENSON, MILTON W.	1968
WINDLE, JIM L.	1968
WITT, HEMERY F.	1971
WOJCIK, JAMES A.	1971
WOLLINGTON, JAMES M.	1966

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AUTHOR	DATE
ADAMS, DEWEY A.	1966
AGNOR, HERBERT E.	1970
ALGER JR, LEON J.	1967
ALLEN, WILLARD A.	1963
AMELON, DONALD J.	1969
ANDRE, NEVIN E.	1964
ARMSTRONG, JAMES A.	1968
ARVEY, RICHARD D.	1970
ASHCRAFT, NORMAN C.	1968
ATKINS, MICHAEL B.	1971
AUER, HERBERT J.	1971
BAAB, CLARENCE T.	1950
BABCOCK, JAMES G.	1969
BAKAMIS, WILLIAM A.	1951
BAKER, GLENN E.	1966
BALDWIN, THOMAS R.	1971
BALL, JOHN E.	1971
BALLO, GARY R.	1971
BASKIN, SAMUEL	1954
BASS, WILBUR A.	1967
BATES, WILFRED M.	1968
BATESON, WILLARD M.	1954
BAUGHER, RICHARD W.	1972
BECK, BURREL H.	1967
BECK, EUGENE J.	1968
BECKER JR, CHARLES W	1967
BECKHAM, JOE W.	1969
BEED, GALER W.	1970
BEHM, HARLEY D.	1967
BENDIX, JOHN L.	1965
BENSON, WILLARD A.	1959
BERGMAN, KENNETH H.	1963
BLOCK, RUDOLPH C.	1970
BOCKMAN, DAVID C.	1971
BOLICK, GERALD M.	1968
BORTZ, WALTER R.	1971
BOSS, RICHARD D.	1968
BOYDEN, LLOYD R.	1972
BOYER, CAROLINE K.	1966
BRADLEY, HARRY L.	1967
BRENCKLE, AUTHUR G.	1968
BROOKER, GEORGE R.	1970
BROOKING, WALTER J.	1948
BROWN, GEORGE C.	1963
BROWN, MARILYN K.	1970
BROWNRIGG, JERRY R.	1962
BRUCE, PHILLIP L.	1964
BRUE, JAMES E.	1969
BURGHARDT, WILLIAM F	1950
BURKERT, WILLIAM G.	1970
BUTTERY, WILLIAM A.	1971
CAGE, BOBBY N.	1968
CALLEN, LOUIS J.	1952
CAMERON, WALTER A.	1969
CANDOLI, I. C.	1967
CARLSEN, DARVEY E.	1961
CARLSON, HENRY L.	1967
CASE, MERL E.	1971
CLABAUGH, RICHARD D.	1971
CLARK, JAMES V.	1967
CLECKLER, JAMES D.	1969
COLEMAN, JAY M.	1971
COLLINS, SAMUEL R.	1962
COMM, WALTER	1967
COMSTOCK, THOMAS W.	1969
COOMER, JERRY W.	1971
CORFIAS, JOHN C.	1967
COTRELL, CALVIN J.	1960
COZZENS, CHARLES R.	1965
CRAFT, CLYDE O.	1967
CRAIG JR, WILLIAM L.	1970
CRAWFORD, HAROLD W.	1960
CRIST, LEROY	1961
CROMER, CHALMERS A.	1970
CROUCH, J. PAGE	1968
CUMMINGS, LAWRENCE J	1969
CUMMINS, CARL C.	1957
DAINES, JAMES R.	1968
DARDEN, BYRNES L.	1951
DARM, ADAM E.	1971
DAVID, WILLIAM J.	1968
DAVIDSON, JOHN E.	1968
DAVIS, JIM L.	1966
DECKER, GEORGE C.	1943
DEVLIN, LEON G.	1971
DEVLIN, LEON G.	1971
DIEDRICK, WALTER E.	1971
DIRKSEN, DENNIS A.	1969
DOLAN, ROBERT E.	1971
DUGGER, CECIL W.	1968
DUNHAM, PHIL R.	1970
DUNLAP, EUGENE W.	1962
DYKE, EUGENE L.	1962
ECKER, LOUIS G.	1965
EDWARDS, LEONARD D.	1971
EICHER, ROBERT S.	1968
ENGLISH, ROBERT W.	1950
EVANS, WILSON A.	1954
FAHS, ELDON E.	1967
FALKENSTINE, JAMES C	1965
FEATHER, DON B.	1949
FEIREK, JOHN L.	1946
FENDLASON, DONALD W.	1969
FISHER, RICHARD E.	1956
FOLEY JR, JOHN P.	1968
FOWLER, EWELL W.	1949
FOWLER, HARMON R.	1970
FOWLER, RICHARD J.	1965
FRAGALE, MARVIN J.	1969
FRANCIS, GEORGE H.	1966
FROELICH, DONALD M.	1970
FROELICH, DONALD M.	1970
FUKAMIZU, RAYMOND H.	1972
GAILEY, DAVID S.	1969
GALLINELLI, JOHN W.	1970
GAVIN, GORDON O.	1968
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
GHEEN, WILLIAM L.	1970
GIFFORD, KENNETH K.	1970
GIMBEL, ARMIN F.	1953
GINTHER, RICHARD E.	1964
GOETZ, ROBERT E.	1958
GOSSAGE, LOYCE C.	1967
GRAHAM, GREGORY S.	1971
GRAY, JAMES A.	1969
GRIFFITH, JOHN L.	1967
GRUMBLING, HENRY M.	1968
HAKANSON, JOHN W.	1967
HAMMACK, CHARLES R.	1967
HAMMER, GARLAND G.	1951
HANKAMMER, OTTO A.	1936
HANSON, DURWIN M.	1956

HARMON, JAMES S.	1969
HARRIS, JAMES G.	1970
HARRIS, JAMES N.	1969
HATLEY, JIMMY D.	1969
HAUER, NELSON A.	1949
HAUGO, RICHARD R.	1969
HAWKINS, LESLIE V.	1953
HELLAND, PHILLIP C.	1964
HENRY, GEORGE F.	1954
HISER, PAUL T.	1958
HOBBS, ADDISON S.	1971
HOMISAK, WILLIAM	1970
HORINE, JOHN W.	1961
HUBBARD, LOUIS H.	1930
HUBER, PAUL M.	1971
HUNT, DE WITT T.	1939
HUSUNG, WILLIAM T.	1970
HYDE, ELDON K.	1968
ISOM, VERNON H.	1970
JACKSON, PETER A.	1965
JACKSON, ROSS P.	1967
JACOBSEN, ECKHART A.	1957
JAMES, WILLIAM E.	1971
JENKINS, NORMAN L.	1969
JOHNSON, DOUGLAS H.	1969
JOHNSON, ELOUISE E.	1967
JOHNSON, HARRY L.	1955
JOHNSON, RAYMOND C.	1971
JOHNSTON, GARVIN H.	1968
JOHNSTON, JOHN L.	1956
JOHNSTON, WALLACE L.	1968
KAHRMANN, ROBERT G.	1970
KANTER, STUART A.	1968
KEITH, CHARLES W.	1964
KEPLER, ATLEE C.	1968
KESEMAN, CHARLES E.	1967
KING, THOMAS G.	1958
KIRKWOOD, JAMES J.	1970
KIST, KEVIN W.	1970
KLABENES, ROBERT E.	1971
KOEHLER, EVERETT E.	1959
KOHLER, RODERICK G.	1952
KRANTZ, MATTHEW B.	1970
KREJCIE, ROBERT V.	1968
KURTH, EDWIN L.	1955
LAMBERT, JAMES H.	1940
LAND, SAMUEL L.	1931
LANDERS, JACK M.	1972
LANDIS, RUSSELL H.	1940
LARSON, IRVING W.	1969
LARSON, RAYMOND H.	1951
LATHROP, ROBERT C.	1969
LAUBENTHAL, CRAIG D.	1969
LAUDA, DONALD P.	1966
LAWS, NORMAN G.	1966
LEAN, ARTHUR E.	1948
LEAVITT, MURRAY P.	1970
LEMONS, CLIFTON D.	1965
LIGHT, KENNETH F.	1967
LINDAHL, DONALD G.	1971
LINNICK, IDA	1949
LITTLE, RICHARD L.	1968
LOWENSTEIN, NORMAN	1955
LUNDY, LYNDALL L.	1968
LYONS, RICHARD A.	1969
MADDOX, MARION E.	1951
MAGOWAN, ROBERT E.	1967
MALEY, DONALD	1949
MALIK, JOSEPH A.	1968
MANGANELLI, FRED D.	1959
MARBURGER, EDWARD F.	1948
MC CALLUM, HARRY N.	1967
MC DOUGLE, LARRY G.	1971
MC EOWEN, ROBERT H.	1967
MC KENZIE, CHARLES R	1971
MC PHERSON, DANIEL W	1971
MELLINGER, BARRY L.	1972
MESSERSCHMIDT, DALE	1967
MESSMAN, WARREN B.	1963
MILLER, MARK E.	1967
MONROE, LYNNE C.	1939
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORGAN JR, ALFRED D.	1967
MORRISON, JESSIE S.	1969
MUDGETT, ALBERT G.	1958
MUND, RICHARD G.	1970
NELSON, REX A.	1963
NEUFELD, JACOB A.	1968
NIELSEN, ERWIN E.	1969
NORTON, ELIZABETH N.	1970
NYSTROM, DENNIS C.	1969
O DELL, ROBERT D.	1963
O NEILL, JOHN N.	1971
O NEILL, JOHN N.	1971
OPPELT, MARION O.	1967
PAPP, ALEXANDER G.	19
PARRY, ERNEST B.	1968
PATTERSON, JOHN R.	1970
PEERSON, RICHARD H.	1969
PERSHING, REX W.	1970
PHALLEN, CHARLES W.	1958
PHILLIPS, DONALD S.	1968
PHILLIPS, KENNETH	1950
PHILLIPS, LOREN D.	1954
PIERSALL, ARNOLD C.	1964
PITTMAN, FRANK M.	1970
PRUSKI, JOHN	1958
PUTMAN, CARL E.	1970
RAICHLE, HENRY F.	1969
RANDEL, STEPHEN V.	1957
REAMS, JAKE W.	1963
REED, WILLIAM T.	1947
REID, DEMPSEY E.	1956
REIMER, MILTON K.	1968
RIETH, CLAUDE E.	1966
ROBERTS, NORMAN N.	1967
ROBERTSON JR, LUTHER	1970
ROBERTSON, LYLE R.	1968
ROBINSON, ORIN R.	1965
ROTHMAN, ROBERT A.	1969
RUEHL, PHILIP W.	1961
RUITER, WILLIAM W.	1971
RYAN, ROBERT D.	1964
SADA, PABLO M.	1971
SCHAEFER, ROGER A.	1969
SCHOLES, CHARLES E.	1968
SCOTT, ROBERT E.	1965
SHAW, GERALD H.	1968
SHERMAN, DOUGLAS R.	1956
SHRADER, ROBERT F.	1967
SHYMONIAK, LEONARD R	1972
SILVEY, WRAY D.	1950
SILVIUS, HAROLD G.	1946
SLATTER, JOHN B.	1970
SMITH SR, JAY T.	1971
SMITH, DARRELL L.	1969
SMITH, FREDDY J.	1970
SMITH, HERBERT E.	1940
SMITH, KENNETH T.	1972
SMITH, ROYAL E.	1969
SOMMERS, WESLEY S.	1961
SONNER, JAN R.	1972
STANTON, WILLIAM A.	1967
STEGMAN, GEORGE K.	1962
STONE, THOMAS C.	1969
STONER, WILLIAM D.	1940
STORY, CHARLES H.	1970
STUESSY, EUGENE L.	1969
SULLIVAN, THOMAS W.	1967
SUTTON, FRED C.	1961
SWAENGSUGDI, THANOO	1959
TAYLOR JR, HOUSTON	1968
TEEL, DEAN A.	1967
THOMAS JR, WADE F.	1957
THOMAS, ALVIN I.	1957
THOMPSON, BRUCE L.	1971
THORNTON, ROBERT W.	1971

TIERNEY, WILLIAM F.	1952
TOBIN, GERALD W.	1972
TOLLEY, CHARLES H.	1969
TORBETT, DANIEL L.	1965
TORRES, LEONARD	1963
TOWERS, EDWARD R.	1956
TRAMBLEY, JOHN B.	1969
TREGO, JOHN W.	1958
TUCKER, CASEY A.	1965
TURNER, ALFRED B.	1941
TURNER, BRIDGES A.	1941
TURNER, BRIDGES A.	1941
TUXHORN, SCOTT E.	1967
UBELACKER, SANDRA D.	1971
VACEK, WILLIAM L.	1962
VANDER LINDE, ALBERT	1971
VASEK, RICHARD J.	1967
VAUGHN, MAURICE S.	1967
VINEYARD, BENNY S.	1962
VOLK, VINCENT A.	1955
VOLPE, GERALD	1969
VON STROH, GORDON E.	1968
WALKER, JOE W.	1970
WALL, GUSTAVE S.	1951
WARGO, WILLIAM D.	1968
WASHBURN, CLYDE I.	1969
WEATHERS, RICHARD D.	1972
WEBB, R. IAN A.	1971
WEBER, EARL M.	1961
WEIR, THOMAS S.	1955
WESTBROOK, CARL O.	1970
WHEELER, EDWARD A.	1965
WHINFIELD, RICHARD W	1969
WHITNEY, LARRY J.	1967
WIED, ALEXANDER F.	1972
WIGEN, RAY A.	1957
WILBER, GEORGE O.	1941
WILKES, DORAN F.	1966
WILSON, ROGER J.	1970
WILSON, WADE	1954
WINTERS, KENNETH W.	1970
WRIGHT, JERAULD B.	1969
YEAGER, LOWERY D.	1965
YOUNG, ROBERT W.	1966
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ALDRICH, TERRY M.	1969
ALLEN, DAVID	1962
ASHBROOK, WILLIAM D.	1944
BAILY, ATHOL R.	1949
BARLOW, MELVIN L.	1949
BARTEL, CARL R.	1959
BATESON, ROBERT E.	1951
BAUER, CARLTON E.	1955
BEATTY, CHARLES J.	1967
BERGENGREN JR, ROY F	1953
BETTINA, ALBERT A.	1953
BLACKBURN, SAMUAL A.	1930
BLECKMAN, JUDITH C.	1971
BLEEKE, MILTON H.	1968
BORRI, ROBERT	1942
BRASTED, F. KENNETH	1953
BRAUN, CHARLES A.	1970
BROWN, NATHAN	1954
BRUSH JR, GEORGE W.	1969
BZOWSKI, EDWARD D.	1969
CASSIMATIS, PETER J.	1967
COMM, WALTER	1967
COOPER, JACK H.	1961
CRAWFORD, NEWTON E.	1972
CRAWSHAW, MARSHALL R	1950
CUMMINGS, LAWRENCE J	1969
CZARNECKI, EDGAR R.	1967
DALTON, FRANCIS W.	1937
DASGUPTA, DEBENDRA C	1932
DAVIDSON, ADELE	1960
DECK, WILLIAM L.	1955
DINGMAN, ERWIN	1949
DITZLER, WALTER E.	1953
DODGE, ARTHUR F.	1935
DYE, CHARLES M.	1971
DYKEHOUSE, JAY	1950
ELLENWOOD, THEODORE	1960
ELLIS, MARY L.	1970
ENCK, HENRY S.	1970
EVANS, HARRY L.	1953
EVERETT, GEORGE A.	1972
FEE, EDWARD M.	1938
FIKE, IRIS L.	1956
FINNEY JR, JOHN D.	1967
FRANKLIN, MARION E.	1952
FREDERICK, LAWRENCE	1955
GENEVRO, GEORGE W.	1966
GILMAN, ROBERT A.	1969
GRAINGE, FLOYD M.	1967
HACKETT, DONALD F.	1953
HALL, CLYDE W.	1953
HAMILTON, ALLEN T.	1941
HAMMER, GERALD K.	1962
HAMMOND, ROBERT G.	1956
HANSEN, GARY B.	1971
HANSSON, KENNETH S.	1966
HARPER, HERBERT D.	1934
HARRISON, OVAL S.	1940
HAWS, ROBERT W.	1947
HEILMAN, CASMER F.	1970
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HILL, JAMES L.	1953
HOLTROP, WILLIAM F.	1948
HORTON, GEORGE R.	1967
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HUNT, DE WITT T.	1939
JENKINS, REESE V.	1966
JOCHEN, ALBERT E.	1947
JOHNSTON, RICHARD E.	1971
KARNES, M. RAY	1948
KING, HOMER P.	1934
KINGERY, LYLE M.	1963
KINGSLEY, LEONARD D.	1972
KLEIMAN, HERBERT S.	1966
KOCH JR, CARL	1972
KRAUSE, ROY W.	1970
KRAUSE, ROY W.	1970
KREMPA, JOHN S.	1966
KRUMBIEGEL, WALTER O	1955
LA BOUNTY JR, HUGH O	1961
LANG, EDWARD H.	1942
LEWIS, MYRON E.	1970
LOUGHLIN, RICHARD L.	1948
LUCE, LAWRENCE W.	1957
MAGENDZO, ABRAHAM	1969
MATTSON, HOMER A.	1970
MAYFIELD, WINIFRED A	1970
MC CRORIE, THOMAS R.	1952
MC ELHENY, JOHN R.	1960
MC GIVNEY, JOSEPH H.	1967
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MEYER, HARVEY K.	1951
MEYERS, ALBERT	1967
MILLER, DAVID H.	1971
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MILLER, MURRAY L.	1947
MILLER, THOMAS W.	1958
MONROE, LYNNE C.	1939
MOODY, RICHARD D.	1968
NEUBAUER, GERHARDT W	1956
PALMER, HAROLD G.	1950
PARKHILL, GEORGE D.	1938
PARNES, SIDNEY J.	1954
PASTER, JULIUS	1959
PATE JR, DOVE H.	1970
PAYZER, MARVIN F.	1954
PEIFFER JR, HERBERT	1939

PENN, THOMAS L.	1968
PENNY, FOREST L.	1960
PORTER, SAM R.	1962
ROBINSON, WALTER J.	1950
ROSS, B. JOHN	1971
ROSS, BENJAMIN P.	1944
RYAN, JAMES E.	1964
SCHURE, ALEXANDER	1950
SEARS JR, WILLIAM P.	1930
SECKENDORF, ROBERT S	1960
SHEFFIELD, EVERETT A	1969
SLACK, NEILL C.	1963
SMITH SR, JAY T.	1971
SMITH, EARL M.	1971
SMITH, HERBERT E.	1940
SOLIMAN, ABDEL RAZEK	1970
SONDERMAN, ROBERT B.	1956
SONNY, JACOB	1971
SPINTI, ROBERT J.	1968
SREDL, HENRY J.	1964
STOMBAUGH, RAY M.	1936
STREICHLER, JERRY	1963
STUART, CHIPMAN G.	1968
SVENDSEN, ETHAN A.	1961
TAYLOR, CYRUS B.	1955
THOMAS, ALVIN I.	1957
THOMAS, KENNETH R.	1967
TWOMBLY, ROBERT C.	1968
URGELL, FRANCISCO C.	1941
VAN DUSEN, EDWARD B.	1948
VAN TASSEL, RAYMOND	1948
WEAGRAFF, PATRICK J.	1971
WIJEYEWARDENE, JALUT	1960
WILBUR, LOUISE	1931
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BATESON, WILLARD M.	1954
BIEWALD, EDWARD C.	1969
BILLINGS, DONN	1953
BLACK, RALPH R.	1959
BLISS, WILLIAM H.	1953
BLOMGREN, GLEN H.	1972
BOLLINGER, ELROY W.	1950
BORRI, ROBERT	1942
BORUM, JOHN F.	1969
BOX SR, MARSHALL R.	1967
BROADHURST, JOHN C.	1949
BUNTEN, CHARLES A.	1955
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CAMPBELL, GORDON	1969
CHARCONCHAI, RUANG	1963
COHEN, JERRY M.	1969
COHEN, LOUIS A.	1965
COLEMAN, WAYNE D.	1967
CONROY JR, WILLIAM G	1969
CORAZZINI, ARTHUR J.	1967
CRUMP, DANNY L.	1968
CRUMPTON, CHARLES R.	1952
D COSTA, AYRES G.	1968
DAVIS, EDDIE M.	1971
DOANE, RAYMOND C.	1956
DOERR, JOHN J.	1967
DRAKE, LAWRENCE C.	1966
EATON, MERRILL T.	1932
ELLIOTT, CHARLES A.	1958
ENGLISH, ROBERT W.	1950
ENVICK, DONALD D.	1968
EPHRAIM, JOHN	1969
EVERSOLL, ROBERT I.	1971
FARABAUGH, MARTIN P.	1966
FARMER, JOE H.	1950
FIKE, IRIS L.	1956
FINDLEY, WILLIAM L.	1967
FORKNER, WILLIAM R.	1968
FRANK JR, HARRY E.	1968
FRESCHET, FERUCIO	1969
FRISBY, RUSSELL C.	1968
FRYE, RONALD M.	1962
GADBOIS, ROBERT L.	1968
GASSERT, WILLIAM M.	1972
GOLOMB, ARTHUR E.	1962
GRADWELL, JOHN B.	1971
GRAINGE, FLOYD M.	1967
GRANNIS, GARY E.	1970
GROVER, JERRY D.	1968
GROVES, RAMSEY M.	1966
HALES, JAMES A.	1972
HARRIS, SUE A.	1970
HARRISON, DENIST D.	1972
HARRISON, ELTON C.	1948
HAWLK, ROBERT H.	1960
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HENDRIX, WILLIAM F.	1967
HILTON, ROSS C.	1970
HOLLOWAY, LEWIS D.	1967
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HOUSKA, JOSEPH T.	1971
HUXOL, ROBERT L.	1954
IRVINE, FLEET R.	1968
ISRAEL, EVERETT N.	1972
IVINS, WILSON H.	1947
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JENSEN, THOMAS R.	1968
JETTER, EVERETT V.	1932
JOHNSON, ROBERT O.	1968
JOHNSON, THOMAS P.	1967
JORDAN, THOMAS F.	1942
JUANG, HWAI-I	1972
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KAZANAS, HERCULES C.	1967
KOEHLER, EVERETT E.	1959
KOHL, ERNEST O.	1949
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LOCKETTE, RUTHERFORD	1956
LOPEZ, GUILLERMO	1970
LOWENSTEIN, NORMAN	1955
LUCK, WILLIAM E.	1966
MALKAN, JEROME M.	1967
MANCHAK, PAUL J.	1965
MARSHALL JR,THOMAS C	1941
MASON, WILLIAM H.	1970
MAYFIELD, WINIFRED A	1970
MAYS, WILLIAM A.	1954
MC ARTHUR, ROSS J.	1955
MC CLEARY, JOSEPH L.	1967
MC LONEY WIRT L.	1965
MC NEIL, JACKSON M.	1968
MEIERHENRY, WESLEY C	1946
MELINE, CHARLES W.	1965
MENEGAT, PAUL A.	1953
MEOSKY, PAUL R.	1967
MICHELSON, EINO S.	1956
MILAM, THOMAS R.	1968
MILLER, JOHN G.	1954
MONGERSON, MARTIN D.	1968
MOORE, ALFRED H.	1954
MORTON, BERRY E.	1950
MULLER, ERWIN T.	1938
NASH, MC KINLEY M.	1972
NELSON, HOWARD F.	1953
NELSON, LLOYD P.	1955
NICKERSON, PAUL S.	1947

NIELSEN, ARNOLD M.	1970
NOTHDURFT, MARIE E.	1972
OAKLEY, HUGH L.	1954
OHLSON, ELI E.	1943
OLSEN, FRED A.	1962
PAINE, HARRY W.	1943
PAINE, HARRY W.	1943
PALOW, WILLIAM P.	1969
PANKOWSKI, DALLAS J.	1966
PAUTLER, ALBERT J.	1967
PEITHMAN, ROSCOE E.	1955
PERDUE, SAUL M.	1954
PHILLIPS JR, MILTON	1967
PLUSCH, JAMES O.	1967
PRUSKI, JOHN	1958
RAY, J. EDGAR	1944
REED, HOWARD O.	1948
REED, HOWARD O.	1943
REISENGER, RAYMOND H	1970
RICE, CHARLES M. M.	1958
RICHARDS, JOHN V.	1970
RINCK, JOE A.	1968
ROBBINS, EVELYN G.	1949
ROBERSON, ROY P.	1967
ROBERTS, LAURENCE A.	1968
ROBINSON, CLARK N.	1947
ROLLINGS, JAMES W.	1967
RUSSELL, LESTER F.	1968
RYAN, ROBERT D.	1964
SALTEN, DAVID G.	1944
SANDERSON, HERBERT	1948
SAWYER, DAVID E.	1972
SCHREIBER, ERNEST	1967
SCHULTZ, IRWIN J.	1949
SHEMICK, JOHN M.	1960
SHIH, WEI-TUN	1969
SHUNN, DONALD W.	1972
SILVER, HARVEY A.	1967
SILVEY, WRAY D.	1950
SMITH JR, CHARLES E.	1969
SOLIMAN, ABDALLA M.	1967
SONDERMAN, ROBERT B.	1956
SPENCER, ALBERT G.	1969
STANGL, OTTO A.	1968
STEEB, RALPH V.	1959
STOMBAUGH, RAY M.	1936
STORMER, DONALD L.	1967
STRANDBERG, C. E.	1963
SVENDSEN, CLARENCE R	1970
TATE, JOHN B.	1971
TATUM JR, JULIAN P.	1967
TAYLOR, FRANK C.	1970
THOMAS, JOSEPH K.	1957
THROWER, ROBERT G.	1961
TORBETT, DANIEL L.	1965
TURNER, ERWIN	1958
TUXHORN, SCOTT E.	1967
UNDERHILL, CHARLES M	1968
VAN DYKE, ARVID W.	1970
VINCENT JR, WALTER C	1972
WAGNER, EDGAR S.	1960
WALLIS, DONALD E.	1965
WARDWELL, WAYNE D.	1950
WARRICK, GLENN D.	19
WERNER, WAYNE E.	1969
WILMOTT, JOHN N.	1941
WILSON, MICHAEL C.	1969
WOCKENFUSS, WILLIAM	1960
WOODEN, RALPH L.	1956
WRIGHT, LAWRENCE S.	1954
WRIGHT, OSCAR W.	1954
YOUMANS, CHARLES V.	1955
YOUNG, TALMAGE B.	1953
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ABROMAITIS, JOSEPH J	1969
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ADAMS, JOHN V.	1947
AINSWORTH, CHESTER B	1956
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ALLEN, WILSON S.	1936
ALSIP JR, BENJAMIN H	1965
ANDERSON, DONALD N.	1963
ANDERSON, ROBERT G.	1967
ANDERSON, W. C.	1954
BAAB, CLARENCE T.	1950
BACKUS, KERBY D.	1968
BAGLEY, RONALD E.	1965
BAILEY JR, JAMES H.	1961
BAILEY, GERALD D.	1964
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BAKAMIS, WILLIAM A.	1951
BAKER, GEORGE L.	1970
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BALL, JOHN E.	1971
BALLARD, JOHN R.	1966
BATES, WILLIAM M.	1969
BATESON, WILLARD M.	1954
BAUER, CARLTON E.	1955
BEARDEN, WILLIAM W.	1967
BEATTY, CHARLES J.	1967
BEDNAR, ERNEST G.	1955
BEKTON, WILLIAM E.	1965
BELL, CHARLES L.	1964
BENDIX, JOHN L.	1965
BENSON, KENNETH R.	1956
BERGENGREN JR, ROY F	1953
BERRY, ARTHUR O.	1967
BIEDLER, JOHN S.	1958
BIGGAM, WILLIAM R.	1958
BIRNBACH, SIDNEY B.	1948
BLACK, DONALD E.	1970
BLISS, WILLIAM H.	1953
BLOMGREN, GLEN H.	1972
BLOMGREN, ROGER D.	1962
BONDE, ROBERT G.	1964
BORRI, ROBERT	1942
BORTZ, RICHARD F.	1967
BORUM, JOHN F.	1969
BOWERS, VICTOR L.	1941
BOWMAN, JAMES E.	1958
BOYDEN, LLOYD R.	1972
BRENNAN, THOMAS J.	1953
BROWN, ROBERT D.	1955
BROWN, WILLIAM E.	1964
BRUECKMAN JR, JOHN C	1969
BURNS, WILLIAM E.	1965
BURROUGHS, MARVIN G.	1970
BUXTON, ROBERT E.	1960
BYROM, JOHN M.	1957
BZOWSKI, EDWARD D.	1969
CALLAWAY, ROLAND L.	1953
CAPRON, JOHN H.	1955
CARLSEN, DARVEY E.	1961
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CAULEY, MICHAEL J.	1971
CAULEY, MICHAEL J.	
CHAMPION, GEORGE	1965
CHARCONCHAI, RUANG	1963
CHARLESWORTH, KENNET	1968
CHAVOUS, ARTHUR M.	1945
CHRISTIAN, JACK B.	1969
CHRISTOFFEL, FREDERI	1960
CLAY, KENNETH R.	1965
COLEMAN, JAY M.	1971
COLLINS, CHARLES J.	1968
COLLINS, HERMAN G.	1966
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CRAWFORD JR, BRYANT	1961
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D AMBROSIO, VINCENT	1969
DARDEN, BYRNES L.	1951
DAVENPORT, JOE U.	1959
DAVIS, EDDIE M.	1971
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DAWSON, KENNETH E.	1965
DE OLD, ALAN R.	1971
DECKER, GEORGE C.	1943
DENNIS, ERVIN A.	1966
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DOUTT, RICHARD F.	1965
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EDWARDS, LEONARD D.	1971
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ENGELBREKTSON, SUNE	1961
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ENZIAN, HAROLD J.	1967
EPHRAIM, JOHN	1969
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ERWIN, WILLIAM R.	1963
ESTABROOKE, EDWARD C	1939
ESTABROOKE, PAUL L.	1939
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FARMER, JOE H.	1950
FAZZINI, PHILLIP A.	1970
FEIRER, JOHN L.	1946
FERNS, GEORGE W.	1962
FINKELSTEIN, ABRAHAM	1959
FLEMING, BRUCE E.	1969
FLUG, EUGENE R.	1967
FOLEY JR, DENIS J.	1967
FOSS, MAURICE F.	1958
FRANKSON, CARL E.	1948
FRITZ, ROBERT C.	1960
FUZAK, JOHN A.	1948
FUZAK, JOHN A.	1954
GADBOIS, ROBERT L.	1968
GAINES, THOMAS R.	1955
GALLINGTON, RALPH O.	1947
GAVIN, GORDON O.	1968
GENEVRO, GEORGE W.	1966
GERBRACHT, CARLTON J	1949
GETTLE, KARL E.	1970
GHEEN, W. LLOYD	1970
GIACHINO, JOSEPH W.	1949
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GILBERT, HAROLD G.	1955
GILL, ROY C.	1972
GINTHER, RICHARD E.	1964
GLISMANN, LEONARD W.	1967
GLOGOVSKY, RONALD J.	1970
GOLOMB, ARTHUR E.	1962
GRADWELL, JOHN B.	1971
GRAHAM, GREGORY S.	1971
GRIESENBROCK JR, HER	1955
GRIFFIN, JAMES F.	1970
GRIFFIN, RAYMOND V.	1965
GROVER, JERRY D.	1968
GUNTHER, THERESA C.	1931
GYSLER, RANDOLPH L.	1971
HAHN, BRUCE J.	1953
HAIGWOOD, THOMAS L.	1959
HALL, JAMES R.	1970
HAMMER, GERALD K.	1962
HAMPTON JR, ISAAC P.	1959
HANKAMMER, OTTO A.	1936
HANKS, WILLIAM S.	1966
HANSEN, RUSSELL G.	1964
HANSON, ROBERT R.	1970
HARDER, JACOB D.	1970
HARLAN, OWEN	1953
HARNEY, LEON T.	1967
HARRIS, EDWIN J.	1971
HARRISON JR, PAUL E.	1955
HASTINGS, JAMES R.	1953
HAUENSTEIN, ALBERT D	1966
HAWKINS, LESLIE V.	1953
HAWLK, ROBERT H.	1960
HAWS, ROBERT W.	1947
HAWSE, JOHN E.	1964
HEATH, JAMES L.	1967
HELTON, H. L.	1958
HENRY, GEORGE F.	1954
HILL, CHARLES R.	1950
HILL, JAMES L.	1953
HILL, JOSHUA	1972
HILTON, ROSS C.	1970
HISER, PAUL T.	1958
HOENES, RONALD L.	1970
HOFER, ARMAND G.	1963
HOLLINSHEAD, MERRILL	1952
HOOTS JR, WILLIAM R.	1966
HORBAKE, R. LEE	1942
HORNBLAKE, R. LEE	1939
HUGHES, WAYNE P.	1942
HUKILL, VIRON N.	1958
HUMBERT 3, JOHN J.	1967
HUXOL, ROBERT L.	1954
HYDER, CARROLL R.	1971
ILOTT, JOHN F. D.	1969
INABA, LAWRENCE A.	1970
INGRAM, FRANKLIN C.	1966
INGRAM, MAURICE D.	1971
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IRGANG, FRANK J.	1956
JACKMAN, DUANE A.	1961
JACKSON, PETER A.	1965
JACOBSEN, JAMES H.	1964
JAGEMAN, LARRY W.	1968
JENNINGS, GERALD L.	1968
JOHNSON, DELTON L.	1968
JOHNSON, IRA H.	1955
JOHNSON, RAYMOND C.	1971
JOHNSON, RAYMOND C.	1971
JOHNSON, RUFUS G.	1949
JOHNSON, VERNER B.	1966
JOLLY, FRANK H.	1970
JONES, GUY R.	1971
KABAKJIAN, EDWARD	1969
KACHEL, STANLEY	1967
KAGY, FREDERICK D.	1959
KAUMEHIEWA, ALSON I.	1969
KEENER, CLYDE	1959
KEIM, WILLIAM E.	1966
KETCHAM, GEORGE W.	1963
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KIRKWOOD, JAMES J.	1970
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KLEINTJES, PAUL L.	1953
KOBLE, RONALD L.	1963

KOONCE, TOMMY R.	1968
KREMPA, JOHN S.	1966
KRUPPA, JOHN R.	1968
KUETEMEYER, VINCENT	1972
KURTH, EDWIN L.	1955
KUWIK, PAUL D.	1970
LANDERS, FREDERICK W	1937
LAPPIN, ALVIN R.	1958
LARSON, DELMAR L.	1964
LARSON, IRVING W.	1969
LARUE, JAMES P.	1968
LENTO, ROBERT	1971
LINDBECK, JOHN R.	1958
LJOSTAD, RODNEY A.	1965
LOATS, HENRY A.	1950
LONDON, HOYT H.	1934
LOW, FRED G.	1963
LUCE, LAWRENCE W.	1957
LUCK, WILLIAM E.	1966
LUCY, JOHN H.	1971
MAC LEAN JR, C. B.	1963
MAHONEY, JAMES H.	1956
MALEY, DONALD	1949
MANSFIELD, ROBERT T.	1959
MARCH, BRYCE D.	1961
MASON, EMMETT E.	1969
MASON, WILLIAM H.	1970
MASSENGILL, JOHN P.	1952
MASSEY, HAL	1965
MAYFIELD, WINIFRED A	1970
MC ARTHUR, ROSS J.	1955
MC CAIN, JERRY C.	1959
MC CLELLAN, LARRY D.	1971
MC CLELLAN, LARRY D.	1971
MC KELL, WILLIAM E.	1970
MC LONEY WIRT L.	1965
MC ROBBIE, J. M.	1963
MEHALLIS, GEORGE	1963
MEOSKY, PAUL R.	1967
MESSMAN, WARREN B.	1963
MEYER, HARVEY K.	1951
MEYER, JOHN M.	1969
MICHEELS, WILLIAM J.	1941
MILLER JR, FRANK M.	1971
MILLER, DUDLEY B.	1965
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MILLER, LARRY R.	1971
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MILLER, MURRAY L.	1947
MILLER, WILBUR R.	1960
MITCHELL, JOHN	1954
MOHEE, N. F.	1968
MONGERSON, MARTIN D.	1968
MONROE, H. B.	1960
MOONEY, JAMES J.	1967
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
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NAIR, RALPH K.	1950
NAROFF, ARNOLD	1971
NELSON, A. FRANK	1955
NELSON, HOWARD F.	1953
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NEVITT, THOMAS A.	1966
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PAGE, CHARLES B.	1953
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PARDINI, LOUIS J.	1967
PASTER, JULIUS	1959
PATE JR, DOVE H.	1970
PAULIN, HENRY S.	1964
PAWELEK, STANLEY J.	1941
PAYZER, MARVIN F.	1954
PEITHMAN, ROSCOE E.	1955
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PERSHERN, FRANK R.	1967
PERSHING, REX W.	1970
PHARES, GAIL J.	1962
PHILLIPS, AUGUSTUS C	1941
PIERSALL, ARNOLD C.	1964
POLESZAK, LEONARD J.	1969
PORTER, SAM R.	1962
POWERS, G. PAT	1961
PROCTOR, BERNARD S.	1950
QUICK, OTHO J.	1954
REAMS, JAKE W.	1963
REED, HOWARD O.	1948
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REID, DEMPSEY E.	1956
REPP, VICTOR E.	1970
RESSLER, RALPH	1966
RICHARDS, JOHN V.	1970
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ROSS, RAYMOND J.	1966
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RUNNALLS, JAMES J.	1965
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SARGENT, WILLIAM T.	1956
SAYOVITZ, JOSEPH J.	1955
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SCHORLING, HORACE O.	1950
SCOBEY, MARY-MARGARE	
SECHREST, CHARLES H.	1953
SECKENDORF, ROBERT S	1960
SEDGWICK, LORRY K.	1965
SEEFIELD, KERMIT A.	1949
SELLON, WILLIAM A.	1950
SHACKELFORD, RICHARD	
SHEFFIELD, EVERETT A	1969
SHEMICK, JOHN M.	1960
SHOEMAKER, CHARLES E	1961
SHULL, HOWARD I.	1969
SHUNN, DONALD W.	1972
SILVIUS, HAROLD G.	1946
SIMICH, JACK	1965
SIRO, EINAR E.	1949
SLACK, NEILL C.	1963
SMALLEY, LEE H.	1962
SMITH, EARL M.	1971
SMITH, IRVING G.	1969
SMITH, JAMES A.	1957
SOURS, CHARLES F.	1969
SQUIBB, ALBERT R.	1967
SREDL, HENRY J.	1964
STAMBOOLIAN JR, JOHN	1972
STANGL, OTTO A.	1968
STEEB, RALPH V.	1959
STEGEMAN, ARTHUR L.	1957
STEPHENSON, LESLIE E	1958
STEVENSON, JAMES E.	1953
STOMBAUGH, RAY M.	1936
STONER, WILLIAM D.	1940

STRICKLAND, THOMAS W	1959
STUART, CHIPMAN G.	1968
STUTEVILLE, CLAUDE E	1971
STUTEVILLE, CLAUDE E	1971
SVENDSEN, CLARENCE R	1970
SVENDSEN, ETHAN A.	1961
SWANSON, WENDELL L.	1964
TALKINGTON, JOE E.	1962
TAXIS, DAVID O.	1962
THIEL, DONALD W.	1959
THIEME, EBERHARD	1965
THOMAS, CHARLES L.	1964
THOMAS, HENRY L.	1971
THOMAS, JOSEPH K.	1957
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THOMPSON, BRUCE L.	1971
THORP, JOHN H.	1945
THROWER, ROBERT G.	1961
TORRES, LEONARD	1963
TSUJI, THOMAS T.	1967
TUCKER, CASEY A.	1965
UNDERHILL, CHARLES M	1968
VACEK, WILLIAM L.	1962
VAN DYKE, ARVID W.	1970
VAUGHN, MAURICE S.	1967
WAHTERA, KAUKO A.	1965
WAISNER, GARY L.	1970
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WALGREN, FLOYD B.	1971
WALLS, W. DALE	1964
WARGO, WILLIAM D.	1968
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WEBER, EARL M.	1961
WEIR, ELDON L.	1970
WENIG, ROBERT E.	1970
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WIED, ALEXANDER F.	1972
WIGEN, RAY A.	1957
WILLIAMS III, WALTER	1963
WILMOTT, JOHN N.	1941
WINDHAM, BILLY L.	1972
WINTERS, KENNETH W.	1970
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WOCKENFUSS, WILLIAM	1960
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WOODY JR, EARL T.	1963
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WRIGHT, WELCOME E.	1953
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ASHBROOK, WILLIAM D.	1944
ASHLEY, LAWRENCE F.	1936
AUSTIN, ROBERT T.	1964
BAILY, ATHOL R.	1949
BARANYAI, WILLIAM A.	1955
BARROWS, FRANK B.	1970
BATESON, ROBERT E.	1951
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BENSON, WILLARD A.	1959
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DANIELS, BLAIR E.	1937
DAVISON, HAROLD J.	1931
DETWILER SR, WAYNE L	1971
DEVLIN, LEON G.	1971
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DITZLER, WALTER E.	1953
DOANE, RAYMOND C.	1956
DRENNAN, JERRY D.	1970
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EDMUNDS, NIEL A.	1969
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ENCK, HENRY S.	1970
ENGLISH, ROBERT W.	1950
ENVICK, ROBERT M.	1970
FAHRLANDER, DANIEL D	1972
FARABAUGH, MARTIN P.	1966
FEE, EDWARD M.	1938
FIKE, IRIS L.	1956
FOWLER, RICHARD J.	1965
FRANKLIN, MARION E.	1952
FREDERICK, LAWRENCE	1955
FRITZ, ROBERT C.	1960
FRYKLUND, VERNE C.	1933
FUZAK, JOHN A.	1948
GAILEY, DAVID S.	1969
GENEVRO, GEORGE W.	1966
GERBRACHT, CARLTON J	1949
GILLILAND, HUGH R.	1967
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GRAMBERG, MERLYN L.	1971
GREER, JOHN S.	1967
GURBACH, THOMAS W.	1972
HACKETT, DONALD F.	1953
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HANSEN, RICHARD H.	1967
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HARRISON, ELTON C.	1948
HARRISON, OVAL S.	1940
HILL, CHARLES R.	1950
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HOSTETLER, IVAN	1945
HOUSKA, JOSEPH T.	1971
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JAHRMAN, QUAIN K.	1964
JOCHEN, ALBERT E.	1947
JONES, GUY R.	1971
KARNES, JOHN W.	1951
KARNES, M. RAY	1948
KARR, DONALD L.	1969
KEIL, RAYMOND L.	1966

KELLY, WILLIAM T.	1966
KENNEKE, LARRY J.	1968
KICKLIGHTER, CLOIS E	1966
KING, THOMAS G.	1958
KOHLER, RODERICK G.	1952
KOO, PO-YEN	1968
KRAUSE, ROY W.	1970
KRAUSE, ROY W.	1970
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KRUMBIEGEL, WALTER O	1955
LANDIS, RUSSELL H.	1940
LAPIDUS, GEORGE	1954
LARSON, CURTIS G.	1971
LARSON, RAYMOND H.	1951
LAUDA, DONALD P.	1966
LAWS, NORMAN G.	1966
LESTER, SEELIG L.	1944
LINDAHL, LAWRENCE G.	1944
LINDAU, ORA F.	1968
LUCE, LAWRENCE W.	1957
LYBARGER, ALVIN E.	
MALLARY, BENJAMIN E.	1932
MANCHAK, PAUL J.	1965
MANNING, GEORGE E.	1971
MARTIN, DONALD H.	1971
MASSENGILL, JOHN P.	1952
MATTSON, HOMER A.	1970
MAUER, DONALD E.	1966
MAXCY, ELLIS O.	1941
MC CRORIE, THOMAS R.	1952
MC ELHENY, JOHN R.	1960
MC KEE, RONALD R.	1971
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MILLER, THOMAS W.	1958
MILLS, EARL S.	1971
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MINTON, GENE D.	1968
MOELLER, CARL A.	1961
MONTELEONE, THOMAS I	1952
NEE, NELSEN V.	1971
NELSON, HILDING E.	1962
NIELSEN, ERWIN E.	1969
NOVOSAD, JOHN P.	1971
OAKS, MERRILL M.	1970
PARKES, GEORGE H.	1939
PARKS, GERALD A.	1969
PETERS, DONALD F.	1959
PFAHL, ALVIN K.	1971
PFAHL, ALVIN K.	1970
PINCKNEY, CHARLES W.	1953
RALSTROM, STIG E.	1969
RANDLEMAN, ROBERT R.	1961
RECKERD, THOMAS E.	1970
REED, WILLIAM T.	1947
RESNICK, HAROLD S.	1970
ROBINSON, CLARENCE L	1972
ROBINSON, WALTER J.	1950
ROWNTREE, URWIN	1951
RUMPF, EDWIN L.	1954
RYAN, JAMES E.	1964
SANDERS, LESTER E.	1967
SCHRAG, MARIE C.	1972
SCHULER, CHARLES A.	1966
SCOTT, CHARLES P.	1943
SEIDEL, JOHN J.	1951
SENTENEY, GEORGE W.	1955
SHOEMAKER, BYRL R.	1957
SINGLETARY, THOMAS A	1968
SIRO, EINAR E.	1949
SLACK, NEILL C.	1963
SLATTER, JOHN B.	1970
SMITH SR, JAY T.	1971
SOMMERFELD, DONALD A	1969
SOURS, CHARLES F.	1969
SPINTI, ROBERT J.	1968
STADT, RONALD W.	1962
STEPHENS, ROBERT L.	1969
STERN, JACOB	1964
STONE, THOMAS C.	1969
STRONG, MERLE E.	1958
STRUCK, JOHN W.	1956
SWANSON, WENDELL L.	1964
SWERDLOW, ROBERT M.	1969
TAKIS, JOHN P.	1972
TAYLOR JR, HOUSTON	1968
TAYLOR, FRANK C.	1970
THOMAS, ALVIN I.	1957
TILLEY, TRUMAN E.	1945
TIMPER, HANS E.	1972
TOBIN, GERALD W.	1972
TURNER, BRIDGES A.	1941
TURNER, BRIDGES A.	1941
WALDORF, ROBERT J.	1971
WALL, EDWARD R.	1972
WALL, GUSTAVE S.	1951
WALLIS, CARL R.	1969
WASHBURN, CLYDE I.	1969
WATKINS, KENNETH E.	1966
WEBSTER, JAY L.	1970
WEINER, DONALD A.	1971
WERNER, WAYNE E.	1969
WHATLEY, ALICE E.	1967
WHITE, ALVIN M.	1958
WISEMAN, EMORY E.	1969
WOLANSKY, WILLIAM D.	1968
WOLLINGTON, JAMES M.	1966
WORTHINGTON, KENT L.	1967
YARRINGTON, HOLLIS R	1970
YOHO, LEWIS W.	1959
YOUNG, ROBERT W.	1966
ZABCIK, CALVIN L.	1969
ZANKOWICH, PAUL	1956
ZULLINGER, JOHN	1966

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ADAMS, AARON F.	1961
ANDERSON, RICHARD B.	1970
ANDERWALD, CARL J.	1947
ARONSON, NORMA	1967
ATTEBERRY, PAT H.	1954
BADER, LOIS	1932
BAILY, ATHOL R.	1949
BAKER, ALFRED E.	1943
BARNETT, LEONARD J.	1969
BENJAMIN, NEAL B.	1969
BLOMGREN, ROGER D.	1962
BRASTED, F. KENNETH	1953
BRITT, ROBERT D.	1966
BROEMAER, GARY M.	1968
BROPHY, JOHN M.	1947
BROWN, GEORGE J.	1960
BROWN, WALTER C.	1954
CAMPBELL, CLIFTON P.	1971
CANTOR, ROBERT L.	1952
CASE, MERL E.	1971
CASSIMATIS, PETER J.	1967
CASSIMATIS, PETER J.	1967
COATES, NORMAN	1967
COATES, SUE S.	1971
COCHRAN, GEORGE C.	1967
COLLONS, RODGER D.	1967
COX, ROBERT L.	1970
CRUDDEN, PAUL B.	1944
CUTLER, THEODORE H.	1948
DANAHER, EUGENE I.	1946
DANAHER, EUGENE I.	1946
DANNENBERG, RAYMOND	1965
DEAN, ERNEST D.	1968
DETRICK, RONALD L.	1972
DIRKSEN, RALPH E.	1969
EDWARDS, JOHN T.	1970
ESTLE, EDWIN F.	1966
EVANCHO, MICHAEL	1947

EVANS, RUPERT N.	1950
FAULDS, VINCENT R.	1956
FAZZINI, PHILLIP A.	1970
FLAHERTY, HUGH	1944
FOSTER, HOWARD G.	1969
FRISBY, RUSSELL C.	1968
FRYKLUND, VERNE C.	1933
FUGAL, GLEN R.	1950
FURIA, JOHN J.	1930
GAILEY, DAVID S.	1969
GAINES, THOMAS R.	1955
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GEBHART, RICHARD H.	1971
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GERBER, RUSSELL L.	1966
GIETL, RUDY E.	1971
GISRIEL, AUSTIN S.	1959
GLEASON, WILLIAM E.	1967
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GOETZ, ROBERT E.	1958
GOLD, CLARENCE H.	1967
GOSSAGE, LOYCE C.	1967
GRANNIS, GARY E.	1970
HAGEMEYER, RICHARD H	1960
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HANEY, PHILIP H.	1949
HARVEY, EDWARD B.	1967
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HOROWITZ, IRVING L.	1939
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HULLE, WILLIAM A.	1972
IACOBELLI, JOHN L.	1969
ISOM, VERNON H.	1970
JELDEN, DAVID L.	1960
JENKINS, REESE V.	1966
KAFFER, FRED C.	1941
KAISER, HAROLD F.	1968
KAISER, HENRY	1968
KAPLAN, HAROLD	1956
KAVIEFF, MELVIN C.	1961
KICKLIGHTER, CLOIS E	1966
KISTLER, DALE E.	1971
KURIEN, CHEMPALATHAR	1967
LAND, SAMUEL L.	1931
LANMAN, RICHARD W.	1953
LARSON, DELMAR L.	1964
LAWS, NORMAN G.	1966
LEFFARD, WARREN L.	1968
LEWIS, MYRON E.	1970
LINE, JOHN D.	1971
LITTLE, RICHARD L.	1968
LOVELESS JR, SIDNEY	1969
LUDINGTON, JOHN R.	1940
LUFF, ANDREW C.	1955
MANGANELLI, FRED D.	1959
MANSFIELD, WESLEY B.	1970
MAXCY, ELLIS O.	1941
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MELINE, CHARLES W.	1965
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MOULLETTE, JOHN B.	1970
NEUBAUER, GERHARDT W	1956
O NEILL, JACK H.	1954
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PORTER. SAM R.	1962
RANDEL, STEPHEN V.	1957
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RIETH, CLAUDE E.	1966
ROBERSON, ROY P.	1967
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SANDBERG, NINA M.	1968
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SCHENCK, JOHN P.	1969
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SEAMAN, DON F.	1968
SHARMA, BALDEV R.	1967
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STANGLE, PAUL L.	1967
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STROM, IRVING E.	1970
STUART, IRVING R.	1951
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THORNTON, ROBERT W.	1971
TIERNEY, WILLIAM F.	1952
TREGILGUS, EARL P.	1954
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VASEK, RICHARD J.	1967
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WARNER, JAMES C.	1962
WATERSTREET, DONALD	1969
WEALE, MARY J.	1968
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WOODRUFF, JAMES N.	1971
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ABITIA, FREDDIE	1971
AMELON, DONALD J.	1969
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BALL, CHARLES E.	1958
BJORNERUD, JAMES A.	1970
BROWN III, ALPHA O.	1971
BROWN III, ALPHA O.	1971
COZZENS, CHARLES R.	1965
CRAFT, CLYDE O.	1967
FINCH, CURTIS R.	1969
FLUG, EUGENE R.	1967
FRANCIS, GEORGE H.	1966
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HILL, EDWIN K.	1968

HOFER, ARMAND G.	1963
HOUSEHOLDER, DANIEL	1963
ILOTT, JOHN F. D.	1969
JELDEN, DAVID L.	1971
JOHNSON, DOUGLAS H.	1969
KASSAY, JOHN A.	1970
KOBLE, RONALD L.	1963
LUCK, WILLIAM E.	1966
MC EOWEN, ROBERT H.	1967
MC MURRY, JAMES G.	1964
MEIERHENRY, WESLEY C	1946
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PRICE, CARROLL S.	1968
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BLANTON, LLOYD H.	1970
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GEBHART, RICHARD H.	1971
GETTLE, KARL E.	1970
GRUMBLING, HENRY M.	1968
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HYDER, CARROLL R.	1971
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MONGERSON, MARTIN D.	1968
O HARA, JAMES S.	1972
OGUNNIYI, OMOTOSHO	1969
PETER, RICHARD F.	1970
PHALLEN, CHARLES W.	1958
PRICE, CARROLL S.	1968
RESNICK, HAROLD S.	1970
ROSSER, ARTHUR J.	1968
RUSSELL, GENE H.	1970
VANN, LOWELL C.	1970
WALGREN, FLOYD B.	1971
WEBER, ROBERT D.	1971
WENIG, ROBERT E.	1970
WEST, WILLIAM E.	1969
WOCKENFUSS, WILLIAM	1960
WOMACK, WILLIAM M.	1971
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AUTHOR	DATE
AGUIRRE, EDWARD	1966
BAKER, NORMAN A.	1971
BARON, ANDREW W.	1968
BENSEN, JAMES M.	1967
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BROADHURST, FREDERIC	1969
BROWN, ALPHA O.	1971
CORNWELL, RAYMOND L.	1961
CRAFT, CLYDE O.	1967
DENNISON, BOBBY	1970
FOWLER, EWELL W.	1949
FRYE, BILL J.	1971
GALE, STEVE	1954
GRUNWALD, WALTER	1968
HARDING, LARRY G.	1971
HATLEY, JIMMY D.	1969
HAYNES, LUTHER J.	1956
HERR, JAMES F.	1970
HOERNER, JAMES L.	1969
HORBAKE, R. LEE	1942
HURLEY, CARL E.	1971
KING, FRANKLIN J.	1970
LEMASTER, LELAN K.	1961
LICHTBLAU, LEONARD R	1958
LONDON, HOYT H.	1934
MC CAGE, RONALD D.	1970
MOEGENBURG, LOUIS A.	1969
MORRILL, DAVID	1970
MORRIS, ALLEN E.	1971
NICKERSON, PAUL S.	1947
NISH, DALE L.	1967
OAKLEY, GARY D.	1970
OGUNNIYI, OMOTOSHO	1969
PHILLIPS, JOSEPH W.	1935
ROSS, B. JOHN	1971
ROSSER, ARTHUR J.	1968
RUEHL, PHILIP W.	1961
SCHOESLER, RONALD D.	1971
SERGEANT, HAROLD A.	1968
SMITH, EARL J.	1968
STEELE, GERALD L.	1967
SULLIVAN, JAMES A.	1967
SWERDLOW, ROBERT M.	1969
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WILLS, VERNON L.	1965
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AUTHOR	DATE
BALL, CHARLES E.	1958
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CALHOUN, MARJORIE R.	1970
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DUFFY, JOSEPH W.	1958
DUTTON, BERNARD	1966
EDDY, EVAN M.	1956
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EPPLER, THOMAS L.	1969
FERNS, GEORGE W.	1962
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FOWLER, EWELL W.	1949
FROELICH, DONALD M.	1970

GUERARD, MICHAEL P.	1971
HAILES, CHARLES W.	1971
HANCOX, FREDERICK J.	1969
HICKMAN, KEITH F.	1967
HOUSKA, JOSEPH T.	1971
HUTCHERSON, ETHEL M.	1966
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JELDEN, DAVID L.	1960
JOHNSON, DELTON L.	1968
JONES, GARY H.	1969
KAPLAN, WILLIAM A.	1970
KING, THOMAS G.	1958
KLEINBACH, MERLIN H.	1959
KOONCE, TOMMY R.	1968
LICHTBLAU, LEONARD R	1958
LONDON, HOYT H.	1934
MAHONEY, JAMES H.	1956
MC CAIN, JERRY C.	1959
MC KEE, RONALD R.	1971
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MILLER, JOHN R.	1970
MILLER, WILBUR R.	1960
MUNS III, NEDOM C.	1969
O NEILL, JOHN N.	1971
OXLEY, VINCENT E.	1969
PAINE, HARRY W.	1943
PAYNE, AM V.	1965
PORTER, HAROLD W.	1948
PREITZ, CLARENCE H.	1969
PUCEL, DAVID J.	1966
PUFAHL, VIRGIL R.	1969
REED, RICHARD L.	1971
REESER, GEORGE W.	1971
RICE, CHARLES M. M.	1958
RILEY, JOHN N.	1972
ROBERTS, LAURENCE A.	1968
ROWEN, MILTON S.	1969
RUEHL, PHILIP W.	1961
RUTEN, WILLIAM H.	1953
SCHANBACHER, EUGENE	1961
SCHOESLER, RONALD D.	1971
SCHOTT, WILLIAM J.	1954
SERGEANT, HAROLD A.	1968
SHOEMAKER, CHARLES E	1961
SMITH, EARL J.	1968
SMITH, JAMES A.	1957
STRONG, MERLE E.	1958
SWERDLOW, ROBERT M.	1969
TOMLINSON, ROBERT M.	1962
TRAUTWEIN, CALVIN L.	1962
TURNER, MERVYN L.	1968
VANN, LOWELL C.	1970
VOGEL, RICHARD F.	1968
WAGNER, EDGAR S.	1960
WARZECHA, EVERETT R.	1972
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WRIGHT, OSCAR W.	1954
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BAILEY, GERALD D.	1964
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BORRI, ROBERT	1942
BORTZ, RICHARD F.	1967
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CHRISTIAN, JACK B.	1969
CLENDENNING, LEE R.	1972
COLLINS, CHARLES J.	1968
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DAVIS, EDDIE M.	1971
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DUTT, KARL F.	1969
ERICKSON, JOHN H.	1953
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FIKE, IRIS L.	1956
GEBHART, RICHARD H.	1971
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HERRING, TOD H.	1962
HOUSEHOLDER, DANIEL	1963
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KABAKJIAN, EDWARD	1969
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KEENER, CLYDE	1959
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LOEPP, FRANZIE L.	1970
MARCH, BRYCE D.	1961
MAYS, WILLIAM A.	1954
MC KELL, WILLIAM E.	1970
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RUGGLES, STANFORD D.	1969
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VOELKNER, ALVIN R.	1970
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ARONSON, NORMA	1967
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DOWNING, DALLAS L.	1941
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EDSALL, ALAN R.	1972
EGGERS, JERRY R.	1970
ESTLE, EDWIN F.	1966
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LINE, JOHN D.	1971
LOVELESS, AUSTIN G.	1962
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BARICH, DEWEY F.	1961
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BASSERI, JAMSHID	1970
BECKER JR, CHARLES W	1967
BLOCK, RUDOLPH C.	1970
BOLICK, GERALD M.	1968
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BURKERT, WILLIAM G.	1970
CANDOLI, I. C.	1967
CARLSON, HENRY L.	1967
CLABAUGH, RICHARD D.	1971
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CLECKLER, JAMES D.	1969
COMBS, STANLEY L.	1948
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DAS, RADHA C.	1950
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DAVID, WILLIAM J.	1968
DAVIDSON, JOHN E.	1968
DE BORD, ROBERT F.	1972
DIRKSEN, DENNIS A.	1969
DONADIO, BLASE	1969
DOUGLASS, STEPHEN A.	
DRAKE, JAMES B.	1972
DUGGER, CECIL W.	1968
ELLINGTON, MARK	1936
FENDLASON, DONALD W.	1969
FIELDING, MARVIN R.	1966
FOLEY JR, JOHN P.	1968
FORGEY, GEORGE W.	1971
FRAGALE, MARVIN J.	1969
FULLER, JOHN A.	1971
GEARING, PHILLIP	1970
GUERARD, MICHAEL P.	1971
GUNDERSON, ORLEY D.	1971
GUY JR, KENNETH H.	1972
HAGEN, DONALD L.	1972
HAKANSON, JOHN W.	1967
HARRIS, JAMES G.	1970
HARTZON JR, WILEY G.	1972
HAYES, BILLY D.	1968
HELBERG, DONALD H.	1969
HOMISAK, WILLIAM	1970
HUSUNG, WILLIAM T.	1970
JENKINS, NORMAN L.	1969
JOHNSON, DOUGLAS H.	1969
JOHNSON, DUANE A.	1972
JOHNSON, ELOUISE E.	1967
JOHNSON, LEONARD R.	1971
JOHNSON, RAY A.	1971
JOHNSTON, GARVIN H.	1968
KAHRMANN, ROBERT G.	1970

KEIM, LAWRENCE	1966
KELLER, JOSEPH M.	1971
KEPLER, ATLEE C.	1968
KINGSLEY, LEONARD D.	1972
KLABENES, ROBERT E.	1971
KOHN, DIXIE A.	1967
KOLLIN, ROBERT	1971
LANGFORD, AL G.	1969
LARSON, MILTON E.	1965
LATHROP, ROBERT C.	1969
LEAVITT, MURRAY P.	1970
LIEN, DAVID A.	1971
LIEN, DAVID A.	1972
LINDAHL, DONALD	1971
LINKSZ, JAMES J.	1971
MAC ARTHUR, EARL W.	1971
MALIK, JOSEPH A.	1968
MARCINOWSKI, MARY E.	1971
MC CALLUM, HARRY N.	1967
MC INNIS, DONALD W.	1971
MC LENNAND, BERNARD	1971
MC PHERSON, DANIEL W	1971
MEYERS, LARRY D.	1968
MILLER, MARK E.	1967
MORGAN JR, ALFRED D.	1967
MORGAN, JIMMY B.	1969
MORRISON, JESSIE S.	1969
NEASHAM, ERNEST R.	1968
NESTOR, HAROLD M.	1971
NEUFELD, JACOB A.	1968
NORTON, ELIZABETH N.	1970
O DELL, ROBERT D.	1963
ODBERT, JOHN T.	1973
OLSON, HERBERT A.	1970
OLSON, RICHARD R.	1971
OMAN, RONALD N.	1971
PARRY, ERNEST B.	1968
PEERSON, RICHARD H.	1969
PRATT, ARDEN L.	1968
PRICE, CARROLL S.	1968
PUFFER, KAREL	1971
RAY, REX E.	1966
RICE JR, JOSEPH A.	1971
ROBERTS JR, LEWIS	1972
ROBERTSON, LYLE R.	1968
SADA, PABLO M.	1971
SCHMITT, CARLOS R.	1971
SCHOLES, CHARLES E.	1968
SCHRAMM, DWAYNE G.	1969
SCOTT, ROBERT E.	1965
SELMAN, JAMES W.	1967
SHAW, GERALD H.	1968
SHYMONIAK, LEONARD R	1972
SINE JR, JOHN M.	1972
SMITH, ROYAL E.	1969
SOLTYS, ROBERT G.	1971
STANTON, WILLIAM A.	1967
STAPLES, JAMES R.	1970
STILLERMAN, MANUEL	1970
STOKES, VERNON L.	1971
STROUT, GEORGE M.	1970
TATSCH, CLINTON E.	1970
TERRY, THOMAS P.	1972
THOMAS JR, WADE F.	1957
THOMPSON, BRUCE L.	1971
TOLLEY, CHARLES H.	1969
TUTHILL, RUSSELL	1970
VALENTINE, IVAN E.	1969
VANDER LINDE, ALBERT	1971
VOLPE, GERALD	1969
WAKITA, OSAMU A.	1970
WALL, EDWARD R.	1972
WALSTON, HARRY W.	1970
WANGER, RUTH	1971
WASHBURN, KENNETH R.	1971
WHINFIELD, RICHARD W	1969
WHITNEY, LARRY J.	1967
WIERSTEINER, SAMUEL	1970
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DAINES, JAMES R.	1968
DE OLD, ALAN R.	1971
DEADY, JOHN J.	1970
DECKER, HOWARD S.	1953
DETWILER SR, WAYNE L	1971
DIRKSEN, RALPH E.	1969
EDDY, EVAN M.	1956
EISS, ALBERT F.	1954
EPPLER, THOMAS L.	1969
ETHIRVEERASINGAM, NA	1971
EVEN, MARY J.	1971
FRAGALE, MARVIN J.	1969
GEBHART, RICHARD H.	1971
GRIFFIN, RAYMOND V.	1965
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HERRING, TOD H.	1962
HEYEL, CLARENCE L.	1967
HILL, JOSHUA	1972
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
IRVINE, FLEET R.	1968
ISRAEL, EVERETT N.	1972
JACOBSEN, JAMES H.	1964
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JELDEN, DAVID L.	1960
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MANNION, EDMUND J.	1972
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MAXON, LLOYD M.	1970
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SAGE, JAMES E.	1971
SCHACHT, ROBERT C.	1971
SCHMITT, MARSHALL L.	1953
SEIGLER, CLAUDE I.	1970
SHIGETOMI, SAMSON S.	1970
SHIGETOMI, SAMSON S.	1970
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WARREN, WILLIAM H.	1970
WHITE, CONRAD L.	1970
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WRIGHT, RONALD T.	1971
WYNN, PHILIP D.	1970
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KARNES, M. RAY	1948
KLATT, LAWRENCE A.	1967
LAND, SAMUEL L.	1931
LE BLANC, DARRELL R.	1971
METZLER, JOHN H.	1970
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ROBINSON, JAMES W.	1967
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CZARNECKI, EDGAR R.	1967
ENGLISH, ROBERT W.	1950
FOWLER, RICHARD J.	1965
GRUMBLING, HENRY M.	1968
KLEHM, WALTER A.	1937
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HEJKAL, OTTO C.	1950
HILL, RICHARD E.	1970
HORTON, GEORGE R.	1967
HOSLER, FRED W.	1938
HUNTINGTON, HAROLD A	1940
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KACHEL, STANLEY	1967
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KING, HOMER P.	1934
KOCH JR, CARL	1972
LOCKE, LEWIS A.	1969
MC CLELLAN, LARRY D.	1971
MC CLELLAN, LARRY D.	1971
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EISENBERG, WILLIAM L	1947
EISS, ALBERT F.	1954
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MANSFIELD, WESLEY B.	1970
MASON, EMMETT E.	1969
MOON, DONALD E.	1968
ORLANDO, FRANK J.	1972
SMALLEY, LEE H.	1962
STEINGART, JACOB	1970
TICHENOR, HAROLD D.	1967
TURNER, ROBERT E.	1957
WAITKUS, LORIN V.	1971
YOUMANS, CHARLES V.	1955
ZOOK, WAYNE H.	1968

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AUTHOR	DATE
BOWMAN, JAMES E.	1958
GILLIE SR, ANGELO C.	1967
GUNDERSON, B. HARRY	1949
HOFFMAN, LARRY D.	1971
KOLLIN, ROBERT	1971
LAWS, NORMAN G.	1966
MARCINOWSKI, MARY E.	1971
MATTHEWS JR, PAUL J.	1972
MYERS, ROY E.	1971
NOLL, ROBERT F.	1967
PEEL, NANCY D.	1967
RONEY, MAURICE W.	1964
SHOEMAKER, BYRL R.	1957
SIMONS, JEROLD J.	1967
SLATTER, JOHN B.	1970
STALLINGS, DANIEL N.	1969
STUESSY, EUGENE L.	1969
WASHBURN, KENNETH R.	1971

MEDA

AUTHOR	DATE
ABRAMSON, BERNARD	1950
BABCOCK, JAMES G.	1969
BAKER, NORMAN A.	1971
BALZER, EUGENE W.	1972
BARON, ANDREW W.	1968
BENDER, MICHAEL	1971
BENSEN, JAMES M.	1967
BOUTWELL JR, COLEN J	1971
BROADHURST, FREDERIC	1969
BROOKS, WESTON T.	1964
BROWN, ALPHA O.	1971
CHASTAIN, GARY K.	1972
CHRISMAN, JOSEPH P.	1970
CORNWELL, RAYMOND L.	1961
CROWDER, GENE A.	1968
DE OLD, ALAN R.	1971
DUTTON, BERNARD	1966
DYER, PALMER E.	1970
EPPLER, THOMAS L.	1969
FLEMING, BRUCE E.	1969
FLUG, EUGENE R.	1967
FROELICH, DONALD M.	1970
GALE, STEVE	1954
GIERKE, EARL W.	1970
GLAZENER, EVERETT R.	1958
GROVES, EDWIN D.	1970
GRUMBLING, HENRY M.	1968
HARMON, JAMES S.	1969
HERR, JAMES F.	1970
HILL, EDWIN K.	1968
HOCH, EMIL H.	1969
HOFER, JARREL	1969
HURLEY, CARL E.	1971
JASNOSZ, THOMAS A.	1969
JELDEN, DAVID L.	1971
JENKINS, JOHN D.	1969
JONES, GARY H.	1969
KING, FRANKLIN J.	1970
KIRKWOOD, JAMES J.	1970
KOONCE, TOMMY R.	1968
KREJOIE, ROBERT V.	1968
KRUPPA, JOHN R.	1968
MC CAGE, RONALD D.	1970
MC CAGE, RONALD D.	1970

MEERS, GARY D.	1972
MILLER, JOHN R.	1970
MOEGENBURG, LOUIS A.	1969
MORRILL, DAVID	1970
MUNS III, NEDOM C.	1969
NESTEL, GERALD E.	1970
NICKERSON, PAUL S.	1947
O NEILL, JOHN N.	1971
O NEILL, JOHN N.	1971
OAKLEY, GARY D.	1970
PAYNE, AM V.	1965
PHILLIPS, JOSEPH W.	1935
PHILLIPS, THOMAS G.	1971
PUFAHL, VIRGIL R.	1969
RAPHAEL, MICHAEL A.	1971
RAPP, ALFRED V.	1972
REESER, GEORGE W.	1971
REESER, GEORGE W.	1971
RILEY, JOHN N.	1972
ROUTH, JERRY D.	1970
ROWEN, MILTON S.	1969
SCHOESLER, RONALD D.	1971
SMITH, EARL J.	1968
SMITH, FREDDY J.	1970
SMITH, JAMES A.	1957
SNYDER, VANCE B.	1960
SUMTER, PAUL E.	1969
THATCHER, GLENN M.	1970
UMSTATTD, WILLIAM D.	1970
WARZECHA, EVERETT R.	1972
WEIR, ELDON L.	1970
WILKES, DORAN F.	1966
WILLS, VERNON L.	1965
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HOERNER, JAMES L.	1969

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AUTHOR	DATE
ABITIA, FREDDIE	1971
ABRAMSON, BERNARD	1950
ABROMAITIS, JOSEPH J	1969
ADAMS, JOHN V.	1947
ADAMS, ROBERT W.	1947
AINSWORTH, CHESTER B	1956
ALEXANDER, WILLIAM F	1969
ALLEN, JOHN C.	1969
AMELON, DONALD J.	1969
AMTHOR, WILLIAM D.	1967
ANDERSON, EDWARD C.	1970
ANDERSON, HERBERT A.	1953
ANDERSON, ROBERT G.	1967
ARMSTRONG, WILLIAM H	1967
ASPER, NORMAN L.	1969
AUER, HERBERT J.	1971
BAILEY JR, JAMES H.	1961
BAKER, GLENN E.	1966
BAKER, NORMAN A.	1971
BALL, CHARLES E.	1958
BALLARD, JOHN R.	1966
BALZER, EUGENE W.	1972
BARBER, CARL S.	1967
BARLOW, GARY C.	1967
BARON, ANDREW W.	1968
BASS, RONALD E.	1971
BAUGHER, RICHARD W.	1972
BAUGRUD, KIM J.	1968
BEATTY, CHARLES J.	1967
BECK, EUGENE J.	1968
BECK, JOHN R.	1964
BECKHAM, JOE W.	1969
BENDER, MICHAEL	1971
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BERGMAN, KENNETH H.	1963
BERGSTROM, PHILIP G.	1970
BERTRAND, CLINT A.	1964
BIEKERT, RUSSELL G.	1971
BIES, JOHN D.	1972
BIGGAM, WILLIAM R.	1958
BJORKQUIST, DAVID C.	1965
BJORNERUD, JAMES A.	1970
BLAND, LARSON M.	1972
BLEDSOE, HARRY J.	1968
BLEEKE, MILTON H.	1968
BOCKMAN, DAVID C.	1971
BORRI, ROBERT	1942
BOUTWELL JR, COLEN J	1971
BOWMAN, ERNEST L.	1932
BRENNER, CHARLES J.	1968
BROADHURST, FREDERIC	1969
BROOKS, WESTON T.	1964
BROWN III, ALPHA O.	1971
BROWN III, ALPHA O.	1971
BROWN, ALPHA O.	1971
BRUDZYNSKI, ALFRED J	1966
BURSE SR, LUTHER	1969
BUXTON, ROBERT E.	1960
CALEY, PAUL C.	1969
CAMPBELL, GORDON	1969
CHASTAIN, GARY K.	1972
CHRISMAN, JOSEPH P.	1970
CLARK, DONALD L.	1967
CLARK, FRANCIS E.	1971
COOMER, JERRY W.	1971
CORNWELL, RAYMOND L.	1961
COZZENS, CHARLES R.	1965
CREMER, KENNETH D.	1970
CROWDER, GENE A.	1968
CUSHING, NELSON N.	1971
DANNENBERG, RAYMOND	1965
DAWSON, KENNETH E.	1965

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AUTHOR	DATE
DE OLD, ALAN R.	1971
DECKER, HOWARD S.	1953
DENNISON, BOBBY	1970
DITLOW, GEORGE H.	1956
DOTY, CHARLES R.	1968
DOUGHERTY, DORA J.	1955
DUNFEE, EMERY S.	1964
DUTTON, BERNARD	1966
EARLE, JAMES H.	1964
EASTON, CLIFFORD W.	1971
ELLIS, NEIL G.	1966
ENTORF, JOHN F.	1967
EPPLER, THOMAS L.	1969
ERICKSON, RICHARD C.	1966
ESTABROOKE, PAUL L.	1939
ESTLE, EDWIN F.	1966
ETHIRVEERASINGAM, NA	1971
FACE, WESLEY L.	1963
FAHRLANDER, DANIEL D	1972
FAZZINI, PHILLIP A.	1970
FERNS, GEORGE W.	1962
FINCH, CURTIS R.	1969
FINKELSTEIN, ABRAHAM	1959
FINLEY, LUTHER E.	1954

FLEMING, BRUCE E.	1969
FLUG, EUGENE R.	1967
FORKNER, WILLIAM R.	1968
FOWLER, EWELL W.	1949
FOWLER, RICHARD J.	1965
FRANCHAK, STEPHEN J.	1971
FRANCHAK, STEPHEN J.	1971
FRANCIS, GEORGE H.	1966
FRESCHET, FERUCIO	1969
FROELICH, DONALD M.	1970
FROELICH, DONALD M.	1970
FRYE, BILL J.	1971
FUGAL, GLEN R.	1950
FURIA, JOHN J.	1930
GAINES, THOMAS R.	1955
GALE, STEVE	1954
GALLINELLI, JOHN W.	1970
GARBEE, EUGENE E.	1949
GEDEON, DAVID V.	1971
GERNE JR, TIMOTHY A.	1967
GETTLE, KARL E.	1970
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
GHEEN, WILLIAM L.	1970
GIERKE, EARL W.	1970
GRIESENBROCK JR, HER	1955
GRIFFITH, JOHN L.	1967
GROTE, CHARLES N.	1960
GROVES, EDWIN D.	1970
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAHN, MARSHALL S.	1967
HAILES, CHARLES W.	1971
HALFIN, HAROLD H.	1973
HANCOX, FREDERICK J.	1969
HANKS, WILLIAM S.	1966
HANSBURG, HENRY	1935
HANSON, ROBERT R.	1970
HARDER, JACOB D.	1970
HARDING, LARRY G.	1971
HARMON, JAMES S.	1969
HARNEY, LEON T.	1967
HASKELL, ROGER W.	1969
HATLEY, JIMMY D.	1969
HEEP, RICHARD H.	1939
HEGER, ROBERT J.	1968
HEPLER, EARL R.	1957
HERBERTS, ROGER E.	1971
HERR, JAMES F.	1970
HESS, HARRY L.	1969
HEYEL, CLARENCE L.	1967
HICKMAN, KEITH F.	1967
HILL, CLAIR S.	1971
HILL, EDWIN K.	1968
HINCKLEY, EDWIN C.	1963
HOCH, EMIL H.	1969
HOERNER, JAMES L.	1969
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HOLT, IVIN L.	1972
HOLT, JAY F.	1970
HOUSEHOLDER, DANIEL	1963
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
ILOTT, JOHN F. D.	1969
INABA, LAWRENCE A.	1970
ISRAEL, EVERETT N.	1972
JACKMAN, DUANE A.	1961
JACOBSEN, ECKHART A.	1957
JAESCHKE, DONALD P.	1971
JASNOSZ, THOMAS A.	1969
JELDEN, DAVID L.	1960
JOHNSON, FRANK F.	1971
JOHNSON, RAY A.	1971
JOHNSON, ROBERT O.	1968
JOHNSTON, JOHN L.	1956
JOLLY, FRANK H.	1970
JONES, GARY H.	1969
KAUMEHIEWA, ALSON I.	1969
KESEMAN, CHARLES E.	1967
KIRKWOOD, JAMES J.	1970
KOBLE, RONALD L.	1963
KRUGER, JOHN M.	1971
KRUPPA, JOHN R.	1968
KURTH, EDWIN L.	1955
LACROIX, WILLIAM J.	1971
LANDERS, JACK M.	1972
LANGAN, PAUL E.	1972
LANGFORD, AL G.	1969
LAPPIN, ALVIN R.	1958
LARUE, JAMES P.	1968
LEASE, ALFRED A.	1964
LEHN, LLOYD L.	1967
LEMASTER, LELAN K.	1961
LEVANDE, JAMES S.	1972
LICHTBLAU, LEONARD R	1958
LINDAHL, LAWRENCE G.	1944
LINDBECK, JOHN R.	1958
LINDEMEYER, RAY S.	1954
LINE, JOHN D.	1971
LINHARDT, RICHARD E.	1971
LLOYD, CLIFFORD J.	1968
LOPEZ, GUILLERMO	1970
LOW, FRED G.	1963
LUCK, WILLIAM E.	1966
LUETKEMEYER, JOSEPH	1961
LUNDY, LYNDALL L.	1968
MAGOWAN, ROBERT E.	1967
MANCHAK, PAUL J.	1965
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MC CAGE, RONALD D.	1970
MC CAGE, RONALD D.	1970
MC EOWEN, ROBERT H.	1967
MC KEE, RONALD R.	1971
MC KEE, RONALD R.	1971
MC LONEY WIRT L.	1965
MC MURRY, JAMES G.	1964
MC PHERSON, DANIEL W	1971
MEERS, GARY D.	1972
MEYER, JOHN M.	1969
MILLER JR, FRANK M.	1971
MILLS, EARL S.	1971
MITCHELL, JOHN	1954
MOEGENBURG, LOUIS A.	1969
MORRILL, DAVID	1970
MORRILL, DAVID	1970
MORRIS, ALLEN E.	1971
MOSS JR, JEROME	1960
MUDGETT, ALBERT G.	1958
MULLER, ERWIN T.	1938
MUNS III, NEDOM C.	1969
MURPHY, JAMES O.	1972
NANNAY, ROBERT W.	1970
NEVITT, THOMAS A.	1966
NEWTON, ROBERT E.	1970
NISH, DALE L.	1967
NORMAN, RALPH P.	1955
NORTON, ROBERT E.	1967
NOTHDURFT, MARIE E.	1972
NOVOSAD, JOHN P.	1971
NYSTROM, DENNIS C.	1969
O HARA, JAMES S.	1972
OAKLEY, GARY D.	1970
OGUNNIYI, OMOTOSHO	1969
OLIVER, GEORGE L.	1970
OLIVER, WILMOT F.	1967
OLSON, DAVID O.	1969
OLSON, DELMAR W.	1957
ORR, WILLIAM H.	1970
PAINE, OLIVE	1930
PAPP, ALEXANDER G.	19
PETERSEN, MOLEN L.	1971
PHILLIPS, JOSEPH W.	1935
PHILLIPS, THOMAS G.	1971
PIERSALL, ARNOLD C.	1964
PORTER, CHARLES B.	1957
POUCHER, KENNETH E.	1968
PRICE, CARROLL S.	1968
PUCEL, DAVID J.	1966

PUFAHL, VIRGIL R.	1969
RAPHAEL, MICHAEL A.	1971
RAPP, ALFRED V.	1972
RAY, J. EDGAR	1944
RAY, REX E.	1966
RAY, WILLIS E.	1957
REBHORN, ELDON A.	1972
REESER, GEORGE W.	1971
REPP, VICTOR E.	1970
RESNICK, HAROLD S.	1970
RICHARDS, KENVYN B.	1970
RICKER, PHILLIP E.	1965
RILEY, JOHN N.	1972
ROBERTS, LAURENCE A.	1968
ROBINSON, CLARK N.	1947
ROKUSEK, H. J.	1964
ROSIN, WILLIAM J.	1969
ROWLETT, JOHN D.	1960
ROWNTREE, URWIN	1951
RUGGLES, STANFORD D.	1969
RUITER, WILLIAM W.	1971
RUSSELL JR, JAMES A.	1967
RUTEN, WILLIAM H.	1953
SAGE, JAMES E.	1971
SANDERS, LESTER E.	1967
SCHACHT, ROBERT C.	1971
SCHANBACHER, EUGENE	1961
SCHULER, CHARLES A.	1966
SEAL, MICHAEL R.	1969
SERGEANT, HAROLD A.	1968
SEXTON, WILLIAM E.	1965
SHEPPARD, LAWRENCE E	1967
SHULL, HOWARD I.	1969
SIMICH, JACK	1965
SMITH, DARRELL L.	1969
SMITH, EARL J.	1968
SMITH, FREDDY J.	1970
SMITH, JAMES A.	1957
SMITH, ROBERT E.	1928
SNYDER, VANCE B.	1960
SOLTYS, ROBERT G.	1971
SOLTYS, ROBERT G.	1971
SOMMER, SEYMOUR A.	1971
SOMMERS, WESLEY S.	1961
SPENCE, WILLIAM P.	1957
ST JOHN, DAVID R.	1971
STAMBOOLIAN JR, JOHN	1972
STANFIELD, FOSTER A.	1971
STANFIELD, FOSTER A.	1971
STANGLE, PAUL L.	1967
STEELE, GERALD L.	1967
STIEGLER, LAIRD B.	1971
SUESS, ALAN R.	1962
SULLIVAN, FRANK V.	1964
SULLIVAN, JAMES A.	1967
SUMTER, PAUL E.	1969
SVENDSEN, CLARENCE R	1970
TEEL, DEAN A.	1967
THATCHER, GLENN M.	1970
THOMPSON, ROBERT L.	1947
TOMLINSON, ROBERT M.	1962
TORBETT, DANIEL L.	1965
TRAUTWEIN, CALVIN L.	1962
VANN, LOWELL C.	1970
VESPER, KARL H.	1969
VOGEL, RICHARD F.	1968
WAGNER, EDGAR S.	1960
WAISNER, GARY L.	1970
WALGREN, FLOYD B.	1971
WALKER, JOE W.	1970
WALKER, LLOYD R.	1946
WARREN, WILLIAM H.	1970
WARZECHA, EVERETT R.	1972
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILKES, DORAN F.	1966
WILLEMS, ALVIN E.	1970
WILLS, VERNON L.	1965
WILSON, RUSSELL C.	1971
WINDLE, JIM L.	1968
WISEMAN, EMORY E.	1969
WOLD, KENNETH M.	1961
WOLFE, JAMES M.	1970
WORTHINGTON, ROBERT	1958
WRIGHT, WELCOME E.	1953
YEAGER, LOWERY D.	1965
YFF, JOOST	1965
YOUNG, WILLIAM H.	1969

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AGUIRRE, EDWARD	1966
AMELON, DONALD J.	1969
ANDERWALD, CARL J.	1947
AXELROD, AARON	1951
BAILEY, GERALD D.	1964
BECKER, DEROLD W.	1969
BOCKMAN, DAVID C.	1971
BRILEY, FRANK E.	1967
BUXTON, ROBERT E.	1960
CAMBELL, CLIFTON P.	1971
CAMPBELL, CLIFTON P.	1971
CUSHING, NELSON N.	1971
DREW, ALFRED S.	1962
EVANS, RUPERT N.	1950
FALLS, JOHN E.	1968
GORDON, LINDA	1971
GRAHAM, GREGORY S.	1971
GRIESENBROCK JR, HER	1955
HALE, LESTER W.	1967
HARPER, HERBERT D.	1934
HAUSER, ROGER E.	1971
HOFER, ARMAND G.	1963
HOOVER, ROGER L.	1967
HOROWITZ, IRVING L.	1939
ILLINIK, ROBERT L.	1971
IVES, JUAY D.	1971
KLEIN, CHARLES T.	1942
LANDERS, FREDERICK W	1937
LEFFARD, WARREN L.	1968
LEHN, LLOYD L.	1967
MC GAW, SIDNEY E.	1952
MEDEIROS, EDWARD J.	1970
MILLER, THOMAS W.	1958
NAROFF, ARNOLD	1971
NICHOLS JR, GEORGE V	1971
NICHOLS JR, GEORGE V	1971
ORR, WILLIAM H.	1970
PARDINI, LOUIS J.	1967
PEDERSEN, GEORGE L.	1957
PITTMAN, FRANK M.	1970
RAMP, WAYNE S.	1956
RAU, GERALD N.	1971
RAY, WILLIS E.	1957
RILEY, JOHN N.	1972
ROSS, RAYMOND J.	1966
RUMMELL, WINFIELD R.	1971
RUSSELL, ELLSWORTH M	1950
RUTEN, WILLIAM H.	1953
SALMON, DANIEL A.	1965
SHIH, WEI-TUN	1969
SINGLETARY, THOMAS A	1968
SOLIMAN, ABDEL RAZEK	1970
SONNY, JACOB	1971
STANGLE, PAUL L.	1967
THOMAS, HENRY L.	1971
TOMLINSON, ROBERT M.	1962
UMSTATTD, WILLIAM D.	1970
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ALEXANDER, WILLIAM F	1969
ALLEN, JOHN C.	1969
ARVEY, RICHARD D.	1970
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BATES, IVAN W.	1971
BECKER, DEROLD W.	1969
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BORTZ, RICHARD F.	1967
BOUTWELL JR, COLEN J	1971
BROWN, GEORGE J.	1960
BZOWSKI, EDWARD D.	1969
CHASTAIN, GARY K.	1972
CLAWSON, LA VERE E.	1967
CLENDENNING, LEE R.	1972
COMER, JOHN C.	1970
COOVER, SHRIVER L.	1941
CUSHING, NELSON N.	1971
D AMBROSIO, VINCENT	1969
DEAN, ROBERT D.	1959
DENOVA, CHARLES C.	1968
DOTY, CHARLES K.	1968
FAGAN, RAYMOND E. B.	1954
FLJG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GIMBEL, ARMIN F.	1953
GRANEY, MAURICE R.	1942
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HENAK, RICHARD M.	1971
HERR, JAMES F.	1970
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HOLM, MELVIN G.	1972
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JENKINS JR, JAMES	1955
JENKINS, JOHN D.	1969
JOLLY, FRANK H.	1970
KASSAY, JOHN A.	1970
KIEFT, LEWIS D.	1970
KRUGER, JOHN M.	1971
KRUPPA, RICHARD A.	1970
LARUE, JAMES P.	1968
LINTON, JOHN A.	1951
LUTZ, RONALD J.	1969
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MC EOWEN, ROBERT H.	1967
MEERS, GARY D.	1972
MEYER, JOHN M.	1969
MILLER, JAMES A.	1971
MILLS, BOYD C.	1967
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NICHOLS JR, GEORGE V	1971
NORTON, ROBERT E.	1967
OAKS, MERRILL M.	1970
ORR, WILLIAM H.	1970
PRITCHARD, MIRIAM C.	1937
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RICHARDSON, ROBERT B	1967
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
STANTON, MILDRED B.	1938
SUESS, ALAN R.	1962
SWANSON, RICHARD A.	1968
THIEME, EBERHARD	1965
WAISNER, GARY L.	1970
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WOMACK, WILLIAM M.	1971
WORTHINGTON, ROBERT	1958

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ELLENWOOD, THEODORE	1960
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LAPIDUS, GEORGE	1954
LOCKETTE, RUTHERFORD	1956
NICHOLSON, DAVID H.	1948
REESER, GEORGE W.	1971
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STANFIELD, FOSTER A.	1971
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ILOTT, JOHN F. D.	1969
KURIEN, CHEMPALATHAR	1967
LINDAHL, LAWRENCE G.	1944
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BATES, WILLIAM M.	1969
BETTIS, LLOYD E.	1971
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LANG, EDWARD H.	1942

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ALLEN, JAY M.	1967
BACKUS, KERBY D.	1968
BIEDLER, JOHN S.	1958
BROWN, WILLIAM E.	1964
BURNS, WILLIAM E.	1965
DAVIDSON, JOHN E.	1968
DENNIS, ERVIN A.	1966
DOTY, CHARLES R.	1968
DUNLAP, EUGENE W.	1962
EALES, ROY G.	1948
HALL, JAMES F.	1954
HAWSE, JOHN E.	1964
HOLTROP, WILLIAM F.	1948
IVINS, WILSON H.	1947
JANECZKO, ROBERT J.	1971
JENNINGS, GERALD L.	1968
JULIAN, LESTER J.	1953
KEITH, CHARLES W.	1964
KEMP, WILLIAM H.	1966
KLEHM, WALTER A.	1937
LAWSON, TOM E.	1973
MASSEY, HAL	1965
MELINE, CHARLES W.	1965
MOELLER, CARL A.	1961
PARDINI, LOUIS J.	1967
POWER, ANDREW T.	1955
ROY, WENDELL L.	1963
SCHAEFER, ROGER A.	1969
TALKINGTON, JOE E.	1962
TURNER, ALFRED B.	1941
TURNER, BRIDGES A.	1941
TURNER, BRIDGES A.	1941
WAINA, RICHARD B.	1969
WOODY JR, EARL T.	1963

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AKEY, WAYNE W.	1952
AL-BUKHARI, NAJATI M	1968
ALLEN, JAY M.	1967
ANDERSON, EDWARD C.	1970
ANDERSON, ROBERT G.	1967
ANDRE, NEVIN E.	1964
ATTEBERRY, PAT H.	1954
BAKER, RONALD D.	1968
BARNETT, LEONARD J.	1969
BARRINGER, DEAN	1971
BASKIN, SAMUEL	1954
BLACK, DONALD E.	1970
BLOMGREN, GLEN H.	1972
BOGETICH, THOMAS M.	1972
BREWSTER, JAMES H.	1971
BROEMAER, GARY M.	1968
BROWN, WALTER E.	1971
BRUE, JAMES E.	1969
BURGETT, DONALD C.	1970
CAMBRIA, SOPHIA T.	1945
CHILSON, JOHN S.	1969
CLABAUGH, RICHARD D.	1971
CLABAUGH, RICHARD D.	1971
COHEN, LOUIS A.	1965
CORMACK, ROBERT B.	1970
CRABTREE, JAMES S.	1967
CRUNKILTON, JOHN R.	1969
CUONY, EDWARD R.	1953
DAUGHERTY, RONALD D.	1971
DEMPSEY, DON G.	1972
DONADIO, BLASE	1969
ENVICK, ROBERT M.	1970
EVERSOLL, ROBERT I.	1971
FEATHER, DON B.	1949
FEGAN, HAROLD J.	1971
FLUEGGE, LYNN K.	1972
FRANTZ JR, NEVIN R.	1967
FRISBY, RUSSELL C.	1968
FUGLSBY, GLEN O.	1965
GASSERT, WILLIAM M.	1972
GOFF, WILLIAM H.	1967
GORDON, KENNITH G.	1971
HALL, DAVID H.	1971
HAYES, BILLY D.	1968
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HULLE, WILLIAM A.	1972
JACKMAN, DUANE A.	1961
JONES, JANIE L.	1969
JUDD, WILLIAM P.	1971
KANTER, STUART A.	1968
KAVIEFF, MELVIN C.	1961
KISTLER, DALE E.	1971
KLEINTJES, PAUL L.	1953
KO, JIIN-RONG	1972
KREIDER, LEONARD E.	1968
KURTZ, HARMON H.	1959
LAHREN, JAMES A.	1970
LE BLANC, DARRELL R.	1971
LEMLEY, JOE W.	1970
LEONARD, REGIS L.	1950
LIEN, DAVID A.	1971
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LINKSZ, JAMES J.	1971
LITTRELL, JOSEPH J.	1958
LOOSLE, DARRELL K.	1967
LOWENSTEIN, NORMAN	1955
MAC ARTHUR, EARL W.	1971
MARTIN, WALDO D.	1970
MARTIN, WILLIAM E.	1970
MC CABE, FRED J.	1970
MC CRACKEN, JOHN D.	1970
MC NEILL, JOSEPH G.	1970
MC ROBBIE, J. M.	1963
MORRISON, JESSIE S.	1969
MORTIMER, WILLIAM E.	1956
MURPHY, JAMES O.	1972
NAROFF, ARNOLD	1971
NASH, MC KINLEY M.	1972
NICHOLS, JACK D.	1970
NIEMELA, ALBERT W.	1949
OLSON, RICHARD R.	1971
PEEL, NANCY D.	1967
PELLEGRIN JR, JOSEPH	1971
PETERSEN, MOLEN L.	1971
PLATA, MACIMINO	1971
PRICE, CARROLL S.	1968
RANDOLPH, JAMES R.	1972
RAYFORD, ERWIN W.	1967
REESER, GEORGE W.	1971
RELYEA, GLADYS M.	1937
RICE JR, JOSEPH A.	1971
RIGGS, DONALD D.	1971
ROBERSON, ROY P.	1967
ROBERTS, LAURENCE A.	1968
ROBINSON, CLARK N.	1947
ROBINSON, CLARK N.	1947
ROBINSON, MENDEL L.	1970
ROBINSON, ORIN R.	1965
RONODIDJOJO, SOEWAN	1968
RUSSELL, SAMUEL E.	1966
SCHELLER, THOMAS G.	1967

SCHOEPPLER, JACOB	1958
SELMAN, JAMES W.	1967
SHIGETOMI, SAMSON S.	1970
SHULTZ, FRED A.	1971
SMITH, EARL J.	1968
STUART, IRVING R.	1951
TATUM JR, JULIAN P.	1967
THORPE, CLAIBURNE B.	1968
TOSH, DONALD J.	1971
TRAMBLEY, JOHN B.	1969
TURECHEK, ARMIN G.	1967
TURNER, ROBERT E.	1957
VAN GIGCH, JOHN P.	1968
VANTRUMP, WILLIAM F.	1961
WALLACE, DONALD F.	1972
WARD, DARRELL L.	1971
WARNER, JAMES C.	1962
WHATLEY, ALICE E.	1967
WHEELER JR, CHARLES	1967
WHYBARK, DAVID C.	1967
WIGGS, GARLAND D.	1971
WILLENSON, MILTON W.	1968
WILLIAMS, ROBERT T.	1969
WYNNE, ROBERT L.	1968
WYSOCK, RAYMOND A.	1972
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ZOPPETTI, MATTHEW	1970

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AUTHOR	DATE
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BROWN, B. WESLEY	1960
BURRIS, WAITUS R.	1967
DE VORE, PAUL W.	1961
DODGE, ARTHUR F.	1935
FAULDS, VINCENT R.	1956
GREER, JOHN S.	1967
HAGGLUND, GEORGE S.	1966
HAMPTON, THOMAS E.	1950
MC DOWELL, LEONARD C	1964
MC INNIS, DONALD W.	1971
MILLER, L. PAUL	1939
MORGAN, DARYLE W.	1968
OGUNNIYI, OMOTOSHO	1969
PLUSCH, JAMES O.	1967
RICHARDSON, ROBERT B	1967
SOLIMAN, ABDALLA M.	1967
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YOUMANS, CHARLES V.	1955

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AUTHOR	DATE
ANDERSON, RAY N.	1932
BADER, LOIS	1932
BAGLEY, RONALD E.	1965
BAKER, ALFRED E.	1943
BARNETTE JR, W. L.	1949
BATES, WILFRED M.	1968
BREWSTER, JAMES H.	1971
BROWN, MILTON T.	1948
CURTIS, BYRON W.	1968
EISS, ALBERT F.	1954
ENVICK, DONALD D.	1968
ERWIN, CLIFFORD H.	1963
FAULDS, VINCENT R.	1956
FLEMING, JOSEPH W.	1937
FUGLSBY, GLEN O.	1965
GAINES, THOMAS R.	1955
GALLUP, LELLAND L.	1970
GERBRACHT, CARLTON J	1949
GIETL, RUDY E.	1971
GOLDBERG, JOEL	1971
GORDON, KENNITH G.	1971
GUDITUS, CHARLES W.	1965
GUY JR, KENNETH H.	1972
HAGEMEYER, RICHARD H	1960
HALL, RONALD W.	1970
HAMPTON, THOMAS E.	1950
HILL, FREDERICK W.	1942
HINRICHS, ROY S.	1964
HODGSON, PAUL M.	1965
HOGHAUG, HAROLD T.	1971
HOROWITZ, IRVING L.	1939
HUNTER, ELVIN M.	1963
INGRAM, THEODORE	1971
JENKINS, JOSEPH R.	1971
JETTER, EVERETT V.	1932
JONES, JANIE L.	1969
JORDAN, KENNETH F.	1969
KAFFER, FRED C.	1941
KARNES, JAMES B.	1966
KJOS, OSCAR E.	1954
KRUSKOP, LEROY L.	1969
LANGERMAN, PHILLIP D	1968
LITTRELL, JOSEPH J.	1958
LUFF, ANDREW C.	1955
MANNING, GEORGE E.	1971
MARTIN, LOREN	1973
MARTIN, WALDO D.	1970
MARTIN, WALDO D.	1970
MEYERS, LARRY D.	1968
MILLER, JOHN R.	1970
MILLS, BOYD C.	1967
O NEILL, JACK H.	1954
PEEL, NANCY D.	1967
PRATER, ROBERT L.	1962
RELYEA, GLADYS M.	1937
RELYEA, GLADYS M.	1937
RICE JR, JOSEPH A.	1971
ROBINSON, MENDEL L.	1970
SCHORLING, HORACE O.	1950
SIMONS, ROBERT M.	1969
SNOW, JOHN W.	1966
SPRANKLE, NORMAN H.	1971
STEPHENS, ROBERT L.	1969
STRUCK, JOHN W.	1956
TATSCH, CLINTON E.	1970
TEMPLE, CHARLES M.	1970
TIFT, KATHERINE F.	1971
TURNER, ERWIN	1958
TURNER, ROBERT E.	1957
VANTRUMP, WILLIAM F.	1961
VINCENT JR, WALTER C	1972
WALSTON, HARRY W.	1970
WARNER, JAMES C.	1962
WEEDE, GARY D.	1967
WENDT, DONALD D.	1962
WHITE, ALVIN M.	1958
WILBUR, LOUISE	1931
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COSSAGE, LOYCE C.	1967
HISER, PAUL T.	1958
HUMBLE, MILFORD K.	1937
IACOBELLI, JOHN L.	1969
JAHRMAN, QUAIN K.	1954
KACHEL, STANLEY	1967
KEIL, RAYMOND L.	1966
KRUPPA, RICHARD A.	1970
MC NEILL, JOSEPH G.	1970
O'NEILL, JACK H.	1954
STAMM, HAROLD S.	1968
SUNDIN, ROBERT L.	1971
TAKIS, JOHN P.	1972

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AL-BUKHARI, NAJATI M	1968
ANDERSON, LOWELL D.	1969
ASPER, NORMAN L.	1969
BACKUS, KERBY D.	1968
BAILY, ATHOL R.	1949
BAIRD, RONALD J.	1960
BELL, CLAUDE A.	1964
BIEDLER, JOHN S.	1958
CALLAWAY, ROLAND L.	1953
CARR, EVA R.	1970
CARTER, JOHN P.	1970
CLABAUGH, RICHARD D.	1971
CLECKLER, JAMES D.	1969
CLEVELAND, JOHN M.	1961
DASGUPTA, DEBENDRA C	1932
DAVIS, WARREN C.	1936
DAVISON, HAROLD J.	1931
DYKEHOUSE, JAY	1950
FAHRLANDER, DANIEL C	1972
FALES, ROY G.	1948
FENDLASON, DONALD W.	1969
FORGEY, GEORGE W.	1971
GALLAGHER, JAMES E.	1970
HALL, CLARENCE E.	1969
HALL, JAMES R.	1970
HAMMER, GARLAND G.	1951
HAMMOND, ROBERT G.	1956
HANSEN, EDITH H.	1972
HARRISON JR, RUSSELL	1971
HARTZON JR, WILEY G.	1972
HAWSE, JOHN E.	1964
HIRSCHI, HARVEY C.	1969
HORNBLAKE, R. LEE	1939
HUXOL, ROBERT L.	1954
HYDE, ELDON K.	1968
KACHEL, STANLEY	1967
KARR, DONALD L.	1969
KELLER, LOUISE J.	1969
KEMP, WILLIAM H.	1966
KINGSLEY, LEONARD D.	1972
KOHN, DIXIE A.	1967
KRAFT, RICHARD H.	1967
KREPEL, WAYNE J.	1967
LAHREN, JAMES A.	1970
LOOSLE, DARRELL K.	1967
MAGISOS, JOEL H.	1968
MALIK, JOSEPH A.	1968
MASON, WILLIAM H.	1970
MASSENGILL, JOHN P.	1952
MC CLELLAN, LARRY D.	1971
MC CLELLAN, LARRY D.	1971
MC CRORIE, THOMAS R.	1952
MC GIVNEY, JOSEPH H.	1967
MC KEE, RONALD R.	1971
MC KEE, RONALD R.	1971
MC KINNEY, FLOYD L.	1969
MC NEIL, JACKSON M.	1968
MEDEIROS, EDWARD J.	1970
MEYER, HARVEY K.	1951
MOELLER, CARL A.	1961
MORGAN, JIMMY B.	1969
MORTIMER, WILLIAM E.	1956
NEASHAM, ERNEST R.	1968
NIELSEN, ARNOLD M.	1970
PATE JR, DOVE H.	1970
PRICHARD, NEAL W.	1962
RALSTROM, STIG E.	1969
RINEHART, RICHARD L.	1966
ROBERTS JR, LEWIS	1972
ROBINSON, WALTER J.	1950
SCHREIBER, ERNEST	1967
SEARS JR, WILLIAM P.	1930
SHELTON, JOHN A.	1968
SHEPARD, JON M.	1968
SHERMAN, DOUGLAS R.	1956
SHIBLER, HERMAN L.	1941
SHULTZ, FRED A.	1971
SLATTERY, RAYMOND A.	1969
SPRECHER, ROBERT E.	1970
STEGMAN, GEORGE K.	1962
SVENDSEN, ETHAN A.	1961
TALKINGTON, JOE E.	1962
TAYLOR, CYRUS B.	1955
TEMPLETON, RONALD K.	1967
THOMAS, CHARLES L.	1964
THOMAS, JOSEPH K.	1957
THORP, JOHN H.	1945
TSUJI, THOMAS T.	1967
WALLACE, DONALD F.	1972
WEAGRAFF, PATRICK J.	1971
WHITESEL, JOHN A.	1940
WILLIS, GEORGE E.	1972
WOCKENFUSS, WILLIAM	1960
WOODY JR, EARL T.	1963
YOUNG, FRED O.	1971
ZULLINGER, JOHN	1966

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ENVICK, DONALD D.	1968
ENVICK, ROBERT M.	1970
GOLOMB, ARTHUR E.	1962
KAISER, HENRY	1968
NISH, DALE L.	1967
OLSEN, GEORGE A.	1971
RUNNALLS, JAMES J.	1965
STEELE, GERALD L.	1967
THORNTON, ROBERT W.	1971
ZOOK, WAYNE H.	1968

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ALLEN, JAY M.	1967
BARNETT, LEONARD J.	1969
CAMBRIA, SOPHIA T.	1945
COHEN, CHESTER G.	1970
COX, ROBERT L.	1970
CUONY, EDWARD R.	1953
DETRICK, RONALD L.	1972
DRENNAN, JERRY D.	1970
DUGGER, CECIL W.	1968
ELMGREN JR, G. THEOD	1963
ERWIN, CLIFFORD H.	1963
FLUCK, BRYAN V.	1970
FRISBY, RUSSELL C.	1968
FUGLSBY, GLEN O.	1965
FULLER, FOSTER D.	
GALLAGHER, JAMES E.	1970
HAYES, BILLY D.	1968
HILLSMAN, SALLY	1970
HOLMES, LONNIE A.	1971
JACKSON, THOMAS A.	1962
KISTLER, DALE E.	1971
LEAVITT, WILLIAM C.	1969
MAC DONALD, MANLEY E	1944
MARTIN, LOREN	1973
MATTESON, GERALD R.	1966
MC CLURE, CLOIS A.	
NIENHAUS, BERNARD J.	1971
NORTON, ELIZABETH N.	1970
O CONNELL, JOHN F.	1971
OLSON, RICHARD R.	1971
PODVIA, M. WAYNE	1972
PRATER, ROBERT L.	1962
RAMP, WAYNE S.	1956
RAYFORD, ERWIN W.	1967
RIETH, CLAUDE E.	1966
ROBINSON, CLARK N.	1947
ROBINSON, ORIN R.	1965
ROSENQUIST, BARBARA	1971
RUMPF, EDWIN L.	1954
RUTHERFORD, WILLIAM	1962
SCHENCK, JOHN P.	1969
SCHRAMM, DWAYNE G.	1969
SHERRELL, EUGENE G.	1969
SOLTYS, ROBERT G.	1971
STUART, WILLIAM R.	1972
THOMPSON, GUERN K.	1971
THORPE, CLAIBURNE B.	1968
TICHENOR, HAROLD D.	1967
TREGO, JOHN W.	1958
TROOBOFF, BENJAMIN M	1968
UBELACKER, SANDRA D.	1971
VINCENT JR, WALTER C	1972
WANGER, RUTH	1971
WARNER, JAMES C.	1962
WASHBURN, KENNETH R.	1971
WATERSTREET, DONALD	1969
WEBB, R. IAN A.	1971
WENDT, DONALD D.	1962
WERTHEIM, JUDITH B.	1971
WIED, ALEXANDER F.	1972
WOMACK, WILLIAM M.	1971
WOMMACK, CHARLES H.	1967
WOOD, GRANT R.	1970
WRIGLEY, MARGARET	1968
ZOOK, WAYNE H.	1968
ZUDAK, LAWRENCE S.	1969

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AUTHOR	DATE
ALLEN, WILLARD A.	1963
DAVIS, JIM L.	1966
ECKER, LOUIS G.	1965
GALE, STEVE	1954
GARRETT, ARTHUR M.	1971
GORDON, KENNITH G.	1971
GRANNIS, GARY E.	1970
HOGHAUG, HAROLD T.	1971
JANECZKO, ROBERT J.	1971
KOEHLER, MYRON	1972
LOCKE, LEWIS A.	1969
LUCK, WILLIAM E.	1966
LUNDY, LYNDALL L.	1968
RINCK, JOE A.	1968
SCHMIDT, HOWARD R.	1971
SULLIVAN, JAMES A.	1967
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WEBSTER, JAY L.	1970

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BING, KENNETH L.	1941
CHAMBERLAIN, DUANE G	1954
DAVISON, HAROLD J.	1931
DUNCAN, GLENN S.	1950
FAHRLANDER, DANIEL C	1972
FAHRLANDER, DANIEL D	1972
MC KENZIE, CHARLES R	1971
MOORE, ALFRED H.	1954
TAYLOR, CYRUS B.	1955
WELSH, BARTON W.	1971
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COATES, NORMAN	1967
COOPER, JACK H.	1961
EGGERS, JERRY R.	1970
EGGERS, JERRY R.	1970
EVEN, MARY J.	1971
FOLTMAN, FELICIAN F.	1950
HALL, CLARENCE E.	1969
HALL, JAMES R.	1970
HIRSCHI, HARVEY C.	1969
HOENES, RONALD L.	1970
HUMBERT 3, JOHN J.	1967
IRGANG, FRANK J.	1956
JOHNSTON, WALLACE L.	1968
JONES, GUY R.	1971
KAVICH, LAWRENCE L.	1964
KELLER, LOUISE J.	1969
KOHN, DIXIE A.	1967
LA BOUNTY JR, HUGH O	1961
LINKSZ, JAMES J.	1971
LONG, GILBERT A.	1970
LYNN, WILLIAM L.	1968
MC CLELLAN, LARRY D.	1971
MC CRACKEN, JOHN D.	1970
MONROE, ALLEN L.	1970
MORGAN, JIMMY B.	1969
O NEILL, JOHN N.	1971
PALMER, HAROLD G.	1950

PARKS, DARRELL L.	1968
ROBERTS, EDWARD R.	1971
RUTHERFORD, WILLIAM	1962
SCHAEFER, ROGER A.	1969
SHULTZ, FRED A.	1971
STAMM, HAROLD S.	1968
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TUTHILL, RUSSELL	1970
VANDERWELL, ALLEN R.	1971
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ANDERSON, EDWARD F.	1970
ASHLEY, JACKSON W.	1971
ATHANASIOU, ROBERT B	1969
AUCKER, JOHN R.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
BLOCK, RUDOLPH C.	1970
BORTZ, WALTER R.	1971
BOYDEN, LLOYD R.	1972
BOYER, CAROLINE K.	1966
BROADHURST, JOHN C.	1949
BROE, JOHN R.	1962
CHILSON, JOHN S.	1969
CHUANG, YING C.	1967
CLAUSEN, JOHN N.	1955
COHEN, JERRY M.	1969
COX, STEVEN G.	1968
D AMBROSIO, VINCENT	1969
DEAN, C. THOMAS	1951
DITTENHAFER, CLARENC	1972
DRAKE, LAWRENCE C.	1966
DYKE, EUGENE L.	1962
ELLIOTT, EARL S.	1967
ELMER, FRANCES W.	1967
ENSMAN, LEO M.	1957
EVANCHO, MICHAEL	1947
FARABAUGH, MARTIN P.	1966
FLEMING, JOSEPH W.	1937
FRYKLUND, VERNE C.	1933
GAINES, THOMAS R.	1955
GARNER, CAREY C.	1969
GIACHINO, JOSEPH W.	1949
GOLDMAN, ROBERT C.	1971
GRIFFIN, JAMES F.	1970
HACKETT, EDWARD V.	1967
HARRIS, VIRGINIA J.	1961
HAUGO, RICHARD R.	1969
HOLLINSHEAD, MERRILL	1952
HORINE, JOHN W.	1961
JARVIS, JOHN A.	1953
JELDEN, DAVID L.	1971
JENKINS, FARRELL T.	1969
JENKINS, NORMAN L.	1969
JOHNSON, MARVIN E.	1959
JOHNSON, RAY A.	1971
JONES, GUY R.	1971
KAPES, JEROME T.	1971
KOUTNIK, PAUL G.	1968
KRANTZ, MATTHEW B.	1970
KRUBECK, FLOYD E.	1954
KUNTZ, ELMER L.	1968
KURTH, EDWIN L.	1955
LACROIX, WILLIAM J.	1971
LARSON, RAYMOND H.	1951
LOWMAN, CLARENCE L.	1967
MICHIE, JACK	1968
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MOORE, LELAND B.	1970
NAIR, RALPH K.	1950
NEEDHAM, RAYMOND J.	1969
NESWICK, LAWRENCE G.	1971
PARKHILL, GEORGE D.	1938
PATTERSON, JOHN R.	1970
PEERSON, RICHARD H.	1969
PITTMAN, FRANK M.	1970
PODVIA, M. WAYNE	1972
QUICK, OTHO J.	1954
RALSTROM, STIG E.	1969
RICHARDSON, ROBERT B	1967
RISHER, CHARLES G.	1953
ROBINSON, FRANK E.	1955
RYAN, ROBERT D.	1964
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SCHULTZ, IRWIN J.	1949
SCOTT, CHARLES P.	1943
SENTENEY, GEORGE W.	1955
SOURS, CHARLES F.	1969
STALLINGS, DANIEL N.	1969
STONE, THOMAS C.	1969
STOUGH, KENNETH F.	1968
STOUGHTON, ROBERT W.	1955
SULLIVAN, THOMAS W.	1967
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TORBETT, DANIEL L.	1965
TUCKER, CASEY A.	1965
UXER, JOHN E.	1967
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VAN OOT, BENJAMIN H.	1932
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WITT, NORMAN E.	1969
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GLOGOVSKY, RONALD J.	1970
GOETZ, ROBERT E.	1958
HANSBURG, HENRY	1935
HERR, JAMES F.	1970
HOBBS, ADDISON S.	1971
JENKINS, JOHN D.	1969
JENKINS, REESE V.	1966
KEMP, WILLIAM H.	1966
MELINE, CHARLES W.	1965
MEYERS, ALBERT	1967
MOREHEAD, JAMES C.	1971
MORRILL, DAVID	1970
MOSS JR, JEROME	1960
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RICE, CHARLES M. M.	1958
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BAKER, RONALD D.	1968
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BRENNER, CHARLES J.	1968
COLCLASER JR, ROBERT	1968
CORNWELL, RAYMOND L.	1961
EASTON, CLIFFORD W.	1971
EVEN, MARY J.	1971
FERNS, GEORGE W.	1962
FINCH, CURTIS R.	1969
HANKS, WILLIAM S.	1966
HARNEY, LEON T.	1967
HARRISON JR, PAUL E.	1955
HOLT, IVIN L.	1972
IVES, QUAY D.	1971
KOUTNIK, PAUL G.	1968
LINDEMEYER, RAY S.	1954
ROWLETT, JOHN D.	1960
SAGE, JAMES E.	1971
SHEPPARD, LAWRENCE E	1967
STANFIELD, FOSTER A.	1971
STEPHENSON, DONALD J	1970
STEPHENSON, DONALD J	1970
TEEL, DEAN A.	1967
WALLS, W. DALE	1964
WEHRLI, ROBERT	1968

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AUTHOR	DATE
CHARLESWORTH, KENNET	1968
ELLINGTON, MARK	1936
FRYE, BILL J.	1971
GAVIN, GORDON O.	1968
GUNDERSON, ORLEY D.	1971
HAUER, NELSON A.	1949
LAPPIN, ALVIN R.	1958
LEAVITT, WILLIAM C.	1969
LINDAHL, DONALD G.	1971
MARBURGER, EDWARD F.	1948
MC NEILL, JOSEPH G.	1970
MILLER, JACK D.	1971
MOONEY, JAMES J.	1967
NIELSEN, ERWIN E.	1969
PREITZ, CLARENCE H.	1969
SPAZIANI, RICHARD L.	1972
STUTEVILLE, CLAUDE E	1971
TATE, JOHN J.	1971
WIGGS, CARLAND D.	1971

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AUTHOR	DATE
COLLONS, RODGER D.	1967
HAUENSTEIN, ALBERT D	1966
MAGOWAN, ROBERT E.	1967
TAGGART, LEO R.	1953

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AUTHOR	DATE
AGUIRRE, EDWARD	1966
ARMSTRONG, WILLIAM H	1967
BALLARD, JOHN R.	1966
BALZER, EUGENE W.	1972
BECK, JOHN R.	1964
BECKHAM, JOE W.	1969
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BERTRAND, CLINT A.	1964
BOCKMAN, DAVID C.	1971
CAMPBELL, GORDON	1969
CHRISMAN, JOSEPH P.	1970
DANNENBERG, RAYMOND	1965
GALLINELLI, JOHN W.	1970
GIERKE, EARL W.	1970
GLAZENER, EVERETT R.	1958
GRIFFITH, JOHN L.	1967
HAHN, MARSHALL S.	1967
HANCOX, FREDERICK J.	1969
HARMON, JAMES S.	1969
HASKELL, ROGER W.	1969
HEYEL, CLARENCE L.	1967
HOCH, EMIL H.	1969
HOUSEHOLDER, DANIEL	1963
LEASE, ALFRED A.	1964
LUNDY, LYNDALL L.	1968
MANCHAK, PAUL J.	1965
MC NAMARA, JAMES F.	1970
MOEGENBURG, LOUIS A.	1969
NAROFF, ARNOLD	1971
NORTON, ROBERT E.	1967
O HARA, JAMES S.	1972
PHILLIPS, THOMAS G.	1971
RICHARDS, KENVYN B.	1970
ROKUSEK, H. J.	1964
RUGGLES, STANFORD D.	1969
SEAL, MICHAEL R.	1969
SHULL, HOWARD I.	1969
SIMICH, JACK	1965
SMITH, DARRELL L.	1969
SMITH, FREDDY J.	1970
TIFT, KATHERINE F.	1971
WARNER, RICHARD A.	1969
WEFFENSTETTE, WALTER	1965
YFF, JOOST	1965

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AUTHOR	DATE
BAKER, GLENN E.	1966
BLEEKE, MILTON H.	1968
DUFFY, JOSEPH W.	1958
HANSEN, PHILLIP W.	1970
ILOTT, JOHN F. D.	1969
KLEHM, WALTER A.	1937
PORTER, SAM R.	1962
WEST, WILLIAM E.	1969

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AUTHOR	DATE
ACHILLES, CHARLES M.	1967
ALLEN, DAVID	1962
BARTEL, CARL R.	1959
BELL, CLAUDE A.	1964
HAHN, BRUCE J.	1953
HAMMOND, HOWARD R.	1971
HORTON, GEORGE R.	1967
JACKSON, PETER A.	1965
JOHNSON, ELOUISE E.	1967
SEARS JR, WOODROW H.	1971

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AUTHOR	DATE
ABDULLABI, BAKRI	1971
ACHILLES, CHARLES M.	1967
ADAMS, JOHN V.	1947
ADAMS, MAYNARD F.	1971
ADAMS, ORVILLE D.	1952
ALDRICH III, DANIEL	1972
ALGER JR, LEON J.	1967
ALKAN, OMER C.	1969
ALLEN, FLEET D.	1971
AMBERSON, MAX L.	1968
ANDERSON, DONALD N.	1963
ANDERSON, ERNEST F.	1966
ANDREWS, EARL R.	1968
ASHBROOK, WILLIAM D.	1944
ASHCRAFT, NORMAN C.	1968
ASPER, NORMAN L.	1969
AXELROD, AARON	1951
BAAB, CLARENCE T.	1950
BAIRD, RONALD J.	1960
BAKER, GLENN S.	1968
BARBER, CARL S.	1967
BARICH, DEWEY F.	1961
BATESON, WILLARD M.	1954
BEACH, ROBERT B.	1967
BEKTON, WILLIAM E.	1965
BESTOR, ROLLIE R.	1969
BLACKBURN, SAMUAL A.	1930
BLECKMAN, JUDITH C.	1971
BLISS, WILLIAM H.	1953
BOAZ, HOLLAND E.	1965
BOYER, CAROLINE K.	1966
BRAME, WILLIAM E.	1967
BROEMAER, GARY M.	1968
BROTHERTON, WILLIAM	1964
BRUECKMAN JR, JOHN C	1969
BRUNTLETT, JOHN E.	1973
BUDKE, WESLEY E.	1970
BURGETT, DONALD C.	1970
BURNS, RICHARD L.	1964
CAMBELL, CLIFTON P.	1971
CAMPBELL, ROBERT A.	1961
CAMPION, HOWARD A.	1941
CANDOLI, I. C.	1967
CARR, HAROLD L.	1970
CAULEY, MICHAEL J.	
CHARLESWORTH, KENNET	1968
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CLARK, DONALD L.	1967
CLARK, JAMES V.	1967
CLEVELAND, JOHN M.	1961
COBURN, JAMES M.	1969
COCHRAN, LESLIE H.	1968
COOPER, JACK H.	1961
COTTON, GEORGE R.	1944
CRAWFORD, NEWTON E.	1972
CRAWSHAW, MARSHALL R	1950
CREMER, KENNETH D.	1970
CROMER, CHALMERS A.	1970
CRUNKILTON, JOHN R.	1969
DAVID, WILLIAM J.	1968
DAVIS, JIM L.	1966
DAVIS, WARREN C.	1936
DEAN, ERNEST D.	1968
DEAN, ROBERT D.	1959
DECKER, GEORGE C.	1943
DOBSON, CLIFFORD G.	1956
DOLEZAL, WILMA M.	1968
DOUCETTE, RUSSELL J.	1972
DOUGLASS, STEPHEN A.	
DRAZEK, STANLEY J.	1950
DREW, ALFRED S.	1962
DUKES, GLENN F.	1969
DYER, PALMER E.	1970
EDMUNDS, NIEL A.	1969
ELIAS, JOHN E.	1970
ELLIS, MARY L.	1970
ENGELBART, LEON P.	1970
EPHRAIM, JOHN	1969
ERWIN, WILLIAM R.	1963
EVERETT, GEORGE A.	1972
FAHRLANDER, DANIEL C	1972
FINNEY JR, JOHN D.	1967
FISHER, RICHARD E.	1956
FORBES, ROY H.	1970
FOWLER, HARMON R.	1970
FRYE, BILL J.	1971
FRYE, ROYE M.	1963
FUGLSBY, GLEN O.	1965
GEHRING, GLEN S.	1969
GELINAS, PAUL J.	1954
GILBERT, HAROLD G.	1955
GLAU, JON E.	1970
GORDON, KENNITH G.	1971
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GRAMBERG, MERLYN L.	1971
GRAY, JAMES A.	1969
GRAY, KENNEY E.	1970
GROVES, EDWIN D.	1970
GROVES, RAMSEY M.	1966
GRUMBLING, HENRY M.	1968
GUDITUS, CHARLES W.	1965
GUY JR, KENNETH H.	1972
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HALFIN, HAROLD H.	1973
HAMPTON, THOMAS E.	1950
HANSEN, JOHN R.	1970
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HARKIS, JAMES G.	1970
HARRISON JR, RUSSELL	1971
HAWS, ROBERT W.	1947
HELLAND, PHILLIP C.	1964
HENDRIX, WILLIAM F.	1967
HERMAN, JAMES A.	1969
HINRICHS, ROY S.	1964
HOPKINS, CHARLES O.	1970
HOPPER, CHARLES H.	1971
HOSTETLER, IVAN	1945
HUBBARD, LOUIS H.	1930
HUKILL, VIRON N.	1958
HUMBERT 3, JOHN J.	1967
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ILLINIK, ROBERT L.	1971
INGRAM, FRANKLIN C.	1966
INGRAM, THEODORE	1971
IRGANG, FRANK J.	1956
JABBARI, EBRAHIM G.	1972
JAESCHKE, DONALD P.	1971
JENKINS JR, JAMES	1955
JENSEN JR, ROBERT D.	1969
JETTER, EVERETT V.	1932
JOHNSON, DUANE A.	1972
JOHNSON, FRANKLIN R.	1969

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BEDWELL, NORMAN W.	1951
BIBB, HERMAN L.	1952
BRENHOLTZ, HAROLD R.	1957
CANADA, BRIAN L.	1972
COX, STEVEN G.	1968
FURIA, JOHN J.	1930
JOHNSON, ELOUISE E.	1967
JORDAN, THOMAS F.	1942
PAYZER, MARVIN F.	1954
RUBIN, MORRIS M.	1950
SCHURE, ALEXANDER	1950
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ARMBRUST, ROBERT W.	1969
ATHANASIOU, ROBERT B	1969
AUCKER, JOHN R.	1970
BARANYAI, WILLIAM A.	1955
BARNETT, LEONARD J.	1969
BARNETTE JR, W. L.	1949
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
BENDIX, JOHN L.	1965
BIRNBACH, SIDNEY B.	1948
BLACK, RICHARD W.	1973
BOHN, RALPH C.	1957
BOVENIZER, ELDRED R.	1968
BPACEY, HYLER J.	1969
BRADSHAW, OTTIE L.	1968
BRINKMAN, FRED J.	1970
CLAWSON, LA VERE E.	1967
COMBS, STANLEY L.	1948
COOVER, SHRIVER L.	1941
CRIST, LEROY	1961
CURTIS, BYRON W.	1968
D COSTA, AYRES G.	1968
DENOVA, CHARLES C.	1968
DENSLEY, KENNETH G.	1967
DITTENHAFER, CLARENC	1972
DOERR, JOHN J.	1967
EISENBERG, WILLIAM L	1947
ELLIOTT, BURTON L.	1971
EPSTEIN, JACK H.	1971
ERICKSON, RICHARD C.	1966
FEATHER, DON B.	1949
FLEMING, JOSEPH W.	1937
FRAZIER, WILLIAM D.	1966
FUEG, HENRY L.	1971
GALLOWAY, JOEL D.	1972
GELINA, ROBERT J.	1972
GIACHINO, JOSEPH W.	1949
HALL, DAVID H.	1971
HANKIN, EDWARD K.	1947
HASKELL, ROGER W.	1969
HELBERG, DONALD H.	1969
HENAK, RICHARD M.	1971
JACKSON, ROSS P.	1967
JAGEMAN, LARRY W.	1968
JELDEN, DAVID L.	1971
JOHNSON, DONALD H.	1966
JONES, JANIE L.	1969
KAPES, JEROME T.	1971
KOUTNIK, PAUL G.	1968
KUETEMEYER, VINCENT	1972
LANMAN, RICHARD W.	1953
LATHROP, ROBERT C.	1969
LOCKETTE, RUTHERFORD	1956
LUTZ, RONALD J.	1969
MAXON, LLOYD M.	1970
MC CABE, FRED J.	1970
MEOSKY, PAUL R.	1967
MESSMAN, WARREN B.	1963
MILLER, AARON J.	1966
MILLER, L. PAUL	1939
MILNOR, BRENT T.	1971
MONROE, H. B.	1960
MORGAN, J. B.	1961
MORTON, BERRY E.	1950
MURPHY, JAMES O.	1972
NASH, MC KINLEY M.	1972
NELSON, HILDING E.	1962
NELSON, REX A.	1963
NICHOLS JR, GEORGE V	1971
NICHOLS JR, GEORGE V	1971
NICHOLSON, DAVID H.	1948
O DELL, ROBERT D.	1963
OMAN, RONALD N.	1971
OPPELT, MARION O.	1967
PALOW, WILLIAM P.	1969
PASSMORE, JAMES L.	1968
PEARSON, WILLIAM W.	1967
PHILLIPS, DONALD S.	1968
PITTMAN, FRANK M.	1970
PLATA, MACIMINO	1971
POLK, HAROLD J.	1969
PORTER, CHARLES B.	1957
POWERS, G. PAT	1961
PRATZNER, FRANK C.	1969
PUFFER, KAREL	1971
PUGH, DWIGHT A.	1969
RANDLEMAN, ROBERT R.	1961
RAPP, ALFRED V.	1972
REAMS, JAKE W.	1963
REISENGER, RAYMOND H	1970
RICE, DON A.	1969
SANDERSON, HERBERT	1948
SANDMAN, CHARLES W.	1969
SCHELLER, THOMAS G.	1967
SCHRAG, MARIE C.	1972
SHEMICK, JOHN M.	1960
SHORE JR, THOMAS C.	1970
SIEVERT, NORMAN W.	1971
SIMPSON, JAMES L.	1970
SLAPER, FRANK M.	1972
SMITH, ROBERT E.	1928
SOLTYS, ROBERT G.	1971
SPAULDING, LLOYD F.	1971
STONE, THOMAS C.	1969
STOUGHTON, ROBERT W.	1955
STRICKLAND, THOMAS W	1959
SULLIVAN, THOMAS W.	1967
TERRY, THOMAS P.	1972
THOMAS, CHARLES L.	1964
TIMPER, HANS E.	1972
TROOBOFF, BENJAMIN M	1968
TSUJI, THOMAS T.	1967
TURNER, MERVYN L.	1968
ULLERY, JESSE W.	1971
ULLERY, JESSE W.	1971
VACEK, WILLIAM L.	1962
WAISNER, GARY L.	1970
WALDORF, ROBERT J.	1971
WANGER, RUTH	1971
WHEELER JR, CHARLES	1967
WHITE, CONRAD L.	1970
WINNICK, ANDREW J.	1971
WISEMAN, EMORY E.	1969
WITT, HENERY F.	1971
WYNNE, ROBERT L.	1968
WYSOCK, RAYMOND A.	1972
YFF, JOOST	1965
ZIMMER, THEODORE A.	1969

JOHNSON, LEONARD R.	1971
JOHNSON, RAYMOND C.	1971
JOHNSON, RAYMOND C.	1971
JUDD, WILLIAM P.	1971
JURKOWITZ, EUGENE L.	1968
KAHRMANN, ROBERT G.	1970
KARNES, JAMES B.	1966
KAVANAUGH, WILLIAM A	1955
KEIM, WILLIAM E.	1966
KELLER, LOUISE J.	1969
KELLY, MICHAEL V.	1968
KELLY, WILLIAM T.	1966
KHOSHZAMIR, FIROUZ	1971
KINGERY, LYLE M.	1963
KINGSLEY, LEONARD D.	1972
KINI, KULAI H.	193?
KRAFT, RICHARD H.	1967
KU, GEORGE C.	1973
LAHREN, JAMES A.	1970
LANGERMAN, PHILLIP D	1968
LAUBENTHAL, CRAIG D.	1969
LEAVITT, MURRAY P.	1970
LOPEZ, GUILLERMO	1970
LUY, JACK A.	1964
LYNN, WILLIAM L.	1968
MAC ARTHUR, EARL W.	1971
MALKAN, JEROME M.	1967
MANESS, MARION T.	1969
MANNION, EDMUND J.	1972
MANSFIELD, WESLEY B.	1970
MARKAH, JOHN A.	1970
MARTIN, DONALD H.	1971
MARTIN, LOREN	1973
MARTIN, WALDO D.	1970
MARTIN, WALDO D.	1970
MAYFIELD, WINIFRED A	1970
MC DOWELL, LEONARD C	1964
MC GAW, SIDNEY E.	1952
MC LENNAND, BERNARD	1971
MEDEIROS, EDWARD J.	1970
MEHAIL, SPIRO	1971
MELLINGER, BARRY L.	1972
MILLER, DAVID H.	1971
MILLER, JAMES A.	1971
MILLER, MARK E.	1967
MILLER, MURRAY L.	1947
MOHEE, N. F.	1968
MONGERSON, MARTIN D.	1968
MONTELLO, PAUL A.	1968
MOORE, ALFRED H.	1954
MORRISEY, THOMAS J.	1965
MUNGER, PAUL R.	1972
MYERS, ROY E.	1971
NEE, NELSEN V.	1971
NEEDHAM, RAYMOND J.	1969
NELSON, LLOYD P.	1955
NEWBURY, DAVID N.	1967
NIENHAUS, BERNARD J.	1971
NOVOSAD, JOHN P.	1971
O NEILL, JOHN N.	1971
OGLE, LEWIS W.	1971
OLSEN, EDWARD G.	1937
OLSEN, EUGENE A.	1968
PARKS, GERALD A.	1969
PATE JR, DOVE H.	1970
PAYNE, AM V.	1965
PELLEGRIN JR, JOSEPH	1971
PERKINS, NEAL B.	1962
PHARES, GAIL J.	1962
PORTER, HAROLD W.	1948
POTTER, DENIS A.	1973
REIMER, MILTON K.	1968
RELYEA, GLADYS M.	1937
RESNICK, HAROLD S.	1970
RIDLEY JR, WILLIAM H	1970
ROBERTS, NORMAN N.	1967
ROBERTSON, LYLE R.	1968
ROBINSON, CLARENCE L	1972
ROSIN, WILLIAM J.	1969
ROSS, B. JOHN	1971
ROSS, HERBERT J.	1970
RUSSELL, SAMUEL E.	1966
RYAN, CHESTER M.	1963
SADA, PABLO M.	1971
SANDBERG, NINA M.	1968
SCHAEFER, CARL J.	1959
SCHMIDT, HOWARD R.	1971
SCHMITT, CARLOS R.	1971
SCHOLES, CHARLES E.	1968
SCHREIBER, ERNEST	1967
SCOTT, ROBERT E.	1965
SECHREST, CHARLES H.	1953
SELF JR, JOHN M.	1967
SHANTHAMALLAPPA, B.	1950
SHAW, GERALD H.	1968
SHIBLER, HERMAN L.	1941
SINE JR, JOHN M.	1972
SLATTERY, RAYMOND A.	1969
SMALLEY, LEE H.	1962
SMITH, DARRELL L.	1969
SMITH, FARMER S.	1969
SPENCE, WILLIAM P.	1957
STADT, RONALD W.	1962
STANGLE, PAUL L.	1967
STEPHENS, GEORGE T.	1969
STOKES, VERNON L.	1971
STUART, WILLIAM R.	1972
SVENDSEN, ETHAN A.	1961
TATSCH, CLINTON E.	1970
TEMPLE, CHARLES M.	1970
UXER, JOHN E.	1967
VAN BENSCHOTEN, RAYM	1971
VAN DYKE, ARVID W.	1970
VANDERWELL, ALLEN R.	1971
WAITKUS, LORIN V.	1971
WAITKUS, LORIN V.	1971
WALL, GUSTAVE S.	1951
WALLIS, CARL R.	1969
WARDWELL, WAYNE D.	1950
WEAGRAFF, PATRICK J.	1971
WEALE, MARY J.	1968
WEBER, ROBERT D.	1971
WEIR, THOMAS S.	1955
WELCH, FREDERICK G.	1971
WELSH, BARTON W.	1971
WENDT, DONALD D.	1962
WENTZ, CHARLES H.	1969
WESTBROOK, CARL O.	1970
WIJEYEWARDENE, JALUT	1960
WILBER, GEORGE O.	1941
WILBUR, LOUISE	1931
WILLIAMS, ROBERT T.	1969
WILLS, VERNON L.	1965
WILSON, WADE	1954
WINEGAR, GARY H.	1969
WINTERS, KENNETH W.	1970
WITHERSPOON, EVERETT	1971
WOLLINGTON, JAMES M.	1966
WOODEN, RALPH L.	1956
WORTHINGTON, KENT L.	1967
WRIGHT, JERAULD B.	1969
WRIGHT, OSCAR W.	1954
WRIGHT, RONALD T.	1971
YOUMANS, CHARLES V.	1955
YOUNG, DARIUS R.	1968
YOUNG, FRED O.	1971
ZABCIK, CALVIN L.	1969
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BAILEY, LARRY J.	1968
BARLOW, GARY C.	1967
BARNETTE JR, W. L.	1949
BARTLETT, WILLIS E.	1967
BEHM, HARLEY D.	1967
BIRNBACH, SIDNEY B.	1948
BLACK, RICHARD W.	1973
BOHN, RALPH C.	1957
BORTZ, RICHARD F.	1967
BRACEY, HYLER J.	1969
BRADSHAW, OTTIE L.	1968
BRINKMAN, FRED J.	1970
CARPENTER, THOMAS E.	1971
CLARK, FRANCIS E.	1971
CLAWSON, LA VERE E.	1967
COCHRAN, GEORGE C.	1967
DENOVA, CHARLES C.	1968
DENSLEY, KENNETH G.	1967
DUTT, KARL F.	1969
EISENBERG, WILLIAM L	1947
ERICKSON, RICHARD C.	1966
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FEATHER, DON B.	1949
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FUZAK, JOHN A.	1948
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GRANDCHAMP, ROBERT J	1971
HACKLER, CLYDE M.	1971
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HASKELL, ROGER W.	1969
HELBERG, DONALD H.	1969
HILL, JAMES L.	1953
HOLM, MELVIN G.	1972
JELDEN, DAVID L.	1971
JOHNSON, DONALD H.	1966
JOHNSON, ROBERT O.	1968
JONES, JANIE L.	1969
KARR, DONALD L.	1969
KAUMEHIEWA, ALSON I.	1969
KEIM, LAWRENCE	1966
KRANTZ, MATTHEW B.	1970
LANGAN, PAUL E.	1972
LANMAN, RICHARD W.	1953
LARUE, JAMES P.	1968
LATHROP, ROBERT C.	1969
LEE, RAPHEL D. C.	1972
LEVANDE, JAMES S.	1972
LOEPP, FRANZIE L.	1970
LUTZ, RONALD J.	1969
MADDOX, MARION E.	1951
MARTINEZ, PETE	1970
MASSENGILL, JOHN P.	1952
MAYS, WILLIAM A.	1954
MC NEILL, JOSEPH G.	1970
MESSMAN, WARREN B.	1963
MEYER, HARVEY K.	1951
NELSON, ORVILLE W.	1967
NICHOLS JR, GEORGE V	1971
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OPPELT, MARION D.	1967
PALOW, WILLIAM P.	1969
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PRITCHARD, MIRIAM C.	1937
PUFFER, KAREL	1971
PUGH, DWIGHT A.	1969
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REAMS, JAKE W.	1963
RICE, DON A.	1969
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RUGGLES, STANFORD D.	1969
SANDERSON, HERBERT	1948
SANDMAN, CHARLES W.	1969
SHEMICK, JOHN M.	1960
SHERCK, CHARLES P.	1969
SHIH, WEI-TUN	1969
SHORE JR, THOMAS C.	1970
SMITH, KAY H.	1962
SOLTYS, ROBERT G.	1971
STOUGHTON, ROBERT W.	1955
STRICKLAND, THOMAS W	1959
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SVENDSEN, ETHAN A.	1961
THIEL, DONALD W.	1959
THOMAS, CHARLES L.	1964
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TICHENOR, HAROLD D.	1967
TSUJI, THOMAS T.	1967
TURNER, MERVYN L.	1968
VAN GIGCH, JOHN P.	1968
WHEELER JR, CHARLES	1967
WHITE, CONRAD L.	1970
WIGHTWICK, BEATRICE	1949
WISEMAN, EMORY E.	1969
WITT, HENERY F.	1971
WREN, HAROLD A.	1941
YUNG, JOHN E.	1965

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BROWNRIGG, JERRY R.	1962
CALHOUN, MARJORIE R.	1970
DRAKE, LAWRENCE C.	1966
DREW, ALFRED S.	1962
EVEN, MARY J.	1971
FROELICH, DONALD M.	1970
HANSBURG, HENRY	1935
HOUSEHOLDER, DANIEL	1963
HOUSKA, JOSEPH T.	1971
HOUSKA, JOSEPH T.	1971
LEASE, ALFRED A.	1964
LOPEZ, DANIEL C.	19
MASON, EMMETT E.	1969
MC CAIN, JERRY C.	1959
MC KELL, WILLIAM E.	1970
MILLER, WILBUR R.	1960
RANDLEMAN, ROBERT R.	1961
RICHARDS, KENVYN B.	1970
WEBER, ROBERT D.	1971
WOLFE, JAMES M.	1970
YOUNG, TALMAGE B.	1953

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AUTHOR	DATE
BIEDLER, JOHN S.	1958
KAUMEHIEWA, ALSON I.	1969
PATE JR, DOVE H.	1970

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CONLEY, FRANKLIN	1968
CRIST, LEROY	1961
EVERSOLL, ROBERT I.	1971
FOLEY JR, DENIS J.	1967
FRISBY, RUSSELL C.	1968
GERBRACHT, CARLTON J	1949
HAGEMEYER, RICHARD H	1960
HULLMAN, DON H.	1971
JAHRMAN, QUAIN K.	1964
KREJCIE, ROBERT V.	1968
LARSON, IRVING W.	1969
MALLARY, BENJAMIN E.	1932
MEHALLIS, GEORGE	1963
MELLMAN, ROBERT A.	1957
MESSERSCHMIDT, DALE	1967
NEUFELD, JACOB A.	1968
O DELL, ROBERT D.	1963
RESSLER, RALPH	1966
RUTHERFORD, WILLIAM	1962
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SENTENEY, GEORGE W.	1955
SIMONS, ROBERT M.	1969
SIRO, EINAR E.	1949
SOURS, CHARLES F.	1969
UBELACKER, SANDRA D.	1971
VAN BENSCHOTEN, RAYM	1971
WALDORF, ROBERT J.	1971
WALDORF, ROBERT J.	1971
WALSH, RAYMOND J.	1965
WEIR, ELDON L.	1970
WHITE, DAVID L.	1973
WIERSTEINER, SAMUEL	1970
WILSON, ROGER J.	1970
WINSEMAN JR, ALBERT	1969
WOLD, KENNETH M.	1961
WOOD, GRANT R.	1970

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AUTHOR	DATE
UNDERHILL, CHARLES M	1968

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AUTHOR	DATE
BAILEY, GERALD D.	1964
BRITT, ROBERT D.	1966
EPSTEIN, JACK H.	1971
KING, THOMAS G.	1958
LINDBECK, JOHN R.	1958
MAC LEAN JR, C. B.	1963
NELSON, ORVILLE W.	1967
ROSS, RAYMOND J.	1966
TALKINGTON, JOE E.	1962
WOODS, WILLIAM H.	1971

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AUTHOR	DATE
ANDERSON, KERMIT P.	1967
BECKHAM, JOE W.	1969
BIRNBACH, SIDNEY B.	1948
BRACEY, HYLER J.	1969
BURGHARDT, WILLIAM F	1950
CHARLESWORTH, KENNET	1968
COBURN, JAMES M.	1969
COMSTOCK, THOMAS W.	1969
CRESSMAN, PAUL L.	1934
ESTABROOKE, EDWARD C	1939
ESTABROOKE, PAUL L.	1939
FUGAL, GLEN R.	1950
GILLILAND SR, LONNIE	1955
HAGGLUND, GEORGE S.	1966
HESS, HARRY L.	1969
HOPPER, CHARLES H.	1971
HOPPER, CHARLES H.	1971
HUGHES, WAYNE P.	1942
HUMBLE, MILFORD K.	1937
KASSAY, JOHN A.	1970
KIGIN, DENIS J.	1959
LINHARDT, RICHARD E.	1971
LOCKE, LEWIS A.	1969
LOVELESS JR, SIDNEY	1969
NICHOLS JR, GEORGE V	1971
NICHOLS JR, GEORGE V	1971
PINCKNEY, CHARLES W.	1953
PRUST, ZENAS A.	1964
WALLACE, NORMAN E.	1968
WILLIAMS, WILLIAM A.	1959

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AUTHOR	DATE
ADAMS, JOHN V.	1947
BUXTON, ROBERT E.	1960
CHAMPION, GEORGE	1965
COLEMAN, WAYNE D.	1967
DOWNS, WILLIAM A.	1968
EISS, ALBERT F.	1954
ENGELBREKTSON, SUNE	1961
GERNE JR, TIMOTHY A.	1967
GRIFFIN, RAYMOND V.	1965
GROTE, CHARLES N.	1960
JENKINS, REESE V.	1966
KLEIN, CHARLES T.	1942
KLEINBACH, MERLIN H.	1959
KOHLER, RICHARD C.	1951
LJOSTAD, RODNEY A.	1965
NOLL, ROBERT F.	1967
PERSHERN, FRANK R.	1967
REMICK, EDWARD L.	
RONEY, MAURICE W.	1964
SHOEMAKER, BYRL R.	1957

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AUTHOR	DATE
AKEY, WAYNE W.	1952
ATHANASIOU, ROBERT B	1969
BECK, RICHARD W.	1971
BENSON, WILLARD A.	1959
COHEN, JERRY M.	1969
CUMMINS, CARL C.	1957
DAUGHERTY, RONALD D.	1971
DODGE, ARTHUR F.	1935
DOUTT, RICHARD F.	1965
EHRENBORG, JOHN D.	1963
FLEMING, JOSEPH W.	1937
FOLEY JR, DENIS J.	1967
FULLER, FOSTER D.	
HAKANSON, JOHN W.	1967
HENRY, GEORGE F.	1954
HULLMAN, DON H.	1971
JAHRMAN, QUAIN K.	1964
JARVIS, JOHN A.	1953
JOHNSON, MARVIN E.	1959
JOHNSON, RUFUS G.	1949
JOHNSTON, WALLACE L.	1968
JONES, GUY R.	1971
KETCHAM, GEORGE W.	1963
KUNTZ, ELMER L.	1968
MAC DONALD, MANLEY E	1944
MALLARY, BENJAMIN E.	1932
MC KENZIE, CHARLES R	1971
MOUTOUX, ALFRED C.	1948
NEUFELD, JACOB A.	1968
O DELL, ROBERT D.	1963
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SIRO, EINAR E.	1949
VYAS, PREMILA H.	1967
WILMOTT, JOHN N.	194
WINDLE, JIM L.	1968
WINSEMAN JR, ALBERT	1969
WITT, NORMAN E.	1969
WOLD, KENNETH M.	1961
WOOD, GRANT R.	1970
YUNG, JOHN E.	1965

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AUTHOR	DATE
ABITIA, FREDDIE	1971
BLACK, RICHARD W.	1973
BRAUN, ROBERT W.	1971
CARPENTER, THOMAS E.	1971
HARRIS, JAMES N.	1969
HARRISON JR, PAUL E.	1955
JANECZKO, ROBERT J.	1971
KERWOOD, ROBERT V.	1967
LANDECKER, LOUIS	1969
LINNICK, IDA	1949
SIEVERT, NORMAN W.	1971
SIMICH, JACK	1965
WASDYKE, RAYMOND G.	1971
WERTHEIM, JUDITH B.	1971
WILBER, GEORGE O.	1941

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AUTHOR	DATE
SNITZ, RUBEN H.	1931

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AUTHOR	DATE
ALLEN, JOHN C.	1969
ARONSON, NORMA	1967
ARONSON, NORMA	1967
BAKER, NORMAN A.	1971
BECKER, DEROLD W.	1969
BENDER, MICHAEL	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BORTZ, RICHARD F.	1967
BOXX, WILLIAM R.	1972
CHASTAIN, GARY K.	1972
CLENDENNING, LEE R.	1972
CUSHING, NELSON N.	1971
D AMBROSIO, VINCENT	1969
DEADY, JOHN J.	1970
DEAN, ROBERT D.	1959
DENOVA, CHARLES C.	1968
DOTY, CHARLES R.	1968
EASTON, CLIFFORD W.	1971
ESTLE, EDWIN F.	1966
FAGAN, RAYMOND E. B.	1954
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GIMBEL, ARMIN F.	1953
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HENAK, RICHARD M.	1971
HEYEL, CLARENCE L.	1967
HOFER, ARMAND G.	1963
HOUSE, ELAINE	1970
HUDSON, DONALD W.	1972
HURLEY, CARL E.	1971
IRVINE, FLEET R.	1968
JAGEMAN, LARRY W.	1968
JANECZKO, ROBERT J.	1971
JOHNSON, RAY A.	1971
JOLLY, FRANK H.	1970
KASSAY, JOHN A.	1970
KIEFT, LEWIS D.	1970
LARUE, JAMES P.	1968
LICHTBLAU, LEONARD R	1958
LINDAHL, LAWRENCE G.	1944
LOCKETTE, RUTHERFORD	1956
LOW, FRED G.	1963
LUTZ, RONALD J.	1969
MANCHAK, PAUL J.	1965
MANNION, EDMUND J.	1972
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MEERS, GARY D.	1972
MEYER, JOHN M.	1969
MIDDLETON, WILLIAM H	1962
MILLER, JAMES A.	1971
MILLS, BOYD C.	1967
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NISH, DALE L.	1967
NORTON, ROBERT E.	1967
OAKS, MERRILL M.	1970
OLSON, DAVID O.	1969
ORR, WILLIAM H.	1970
REBHORN, ELDON A.	1972
RICHARDSON, ROBERT B	1967
RIDLEY JR, WILLIAM H	1970
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SCHACHT, ROBERT C.	1971
SEIGLER, CLAUDE I.	1970
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971

ST JOHN, DAVID R.	1971
STANTON, MILDRED B.	1938
SUESS, ALAN R.	1962
SWANSON, RICHARD A.	1968
THOMAS, MAURICE G.	1968
WAISNER, GARY L.	1970
WAISNER, GARY L.	1970
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

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AUTHOR	DATE
ANDERSON, W. C.	195
BEED, GALER W.	197
CHRISTOFFEL, FREDERI	196
DETWILER SR, WAYNE L	197
DRAWDY, LARRY A.	197
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AUTHOR	DATE
BAKAMIS, WILLIAM A.	1951
BAUGHER, RICHARD W.	1972
BLANTON, LLOYD H.	1970
BOWDOIN, PAUL	1966
BRANDON, GEORGE L.	1952
CHRISTOFFEL, FREDERI	1960
COTRELL, CALVIN J.	1950
CRESSMAN, PAUL L.	1934
CRUDDEN, PAUL B.	1944
EDWARDS, JOHN T.	1970
EISENBERG, WILLIAM L	1947
EISS, ALBERT F.	1954
FEGAN, HAROLD J.	1971
FOLTMAN, FELICIAN F.	1950
GILBERT, HAROLD G.	1955
HAMMACK, CHARLES R.	1967
HEGER, ROBERT J.	1968
JOHNSON, VERNER B.	1966
KOHRAM, GEORGE E.	1952
LESTER, SEELIG L.	1944
LINE, JOHN D.	1971
LONG, GILBERT A.	1970
LOVELESS JR, SIDNEY	1969
LUFF, ANDREW C.	1955
MAGISOS, JOEL H.	1968
MALIK, JOSEPH A.	1968
MANNING, GEORGE E.	1971
MANSFIELD, WESLEY B.	1970
MARSHALL, CHARLES K.	1971
MC CRACKEN, JOHN D.	1970
MC ROBBIE, J. M.	1963
MERTZ, OTTO	1954
MICHEELS, WILLIAM J.	1941
MILLER, JACK D.	1971
MORRISEY, THOMAS J.	1965
OLIVER, WILMOT F.	1967
PARNES, SIDNEY J.	1954
PEARSON, WILLIAM W.	1967
PETERS, DONALD F.	1959
POLK, HAROLD J.	1969
RICE, DICK C.	1966
RIETH, CLAUDE E.	1966
RIMLER, GEORGE W.	1969
ROWEN, MILTON S.	1969
SARGENT, WILLIAM T.	1956
SAWYER, DAVID E.	1972
SCHANK, KENNETH L.	1965
SCHOEPPLER, JACOB	1958
SCHORLING, HORACE O.	1950
SCHOTT, WILLIAM J.	1954
SECHREST, CHARLES H.	1953
SECKENDORF, ROBERT S	1960
SMITH, FARMER S.	1969
SMITH, IRVING G.	1969
SOULE, DAVID H.	1966
STANGER, NORMAN R.	1967
STEEB, RALPH V.	1959
STEVENSON, JAMES E.	1953
STEWART, WILLIAM J.	1968
TATE, HAROLD S.	1951
TAXIS, DAVID O.	1962
TOBIN, GERALD W.	1972
TUXHORN, SCOTT E.	1967
VINEYARD, BENNY S.	1962
WALKER, LLOYD R.	1946
WARD, DARRELL L.	1971
WASDYKE, RAYMOND G.	1971

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ABDULLABI, BAKRI	1971
ADAMS, MAYNARD F.	1971
AGNOR, HERBERT E.	1970
ALDRICH, TERRY M.	1969
ALLEN, FLEET D.	1971
ALTUS, DAVID M.	1972
ANDERSON, RICHARD B.	1970
ANDRE, NEVIN E.	1964
ANDREWS JR, JOE R.	1968
ANDREYKA, ROBERT E.	1969
ARCHER, ELTON W.	1971
ARMSTRONG, JAMES A.	1968
ARMSTRONG, WILLIAM H	1967
ARNOLD, JOSEPH P.	1965
BAILEY, DONALD A.	1970
BARBER, CARL S.	1967
BATES, WILFRED M.	1968
BEACH, CHARLES K.	1941
BEED, GALER W.	1970
BESTOR, ROLLIE R.	1969
BETTIS, LLOYD E.	1971
BOAZ, HOLLAND E.	1965
BOSS, RICHARD D.	1968
BOSTROM, EDWIN O.	1971
BOTTOMS, JAMES E.	1965
BOYER, CAROLINE K.	1966
BRADSHAW, OTTIE L.	1968
BRAME, WILLIAM E.	1967
BRAUN, CHARLES A.	1970
BRAUN, ROBERT W.	1971
BRIGGS, LLOYD D.	1971
BRILEY, FRANK E.	1967
BROE, JOHN R.	1962
BROWN, GEORGE J.	1960
BROWN, MARILYN K.	1970
BROWN, WALTER E.	1971
BRUE, JAMES E.	1969
BRUSH JR, GEORGE W.	1969
BURKERT, WILLIAM G.	1970

BURNS, RICHARD L.	1964
BUZZELL, CHARLES H.	1970
CARPENTER, THOMAS E.	1971
CHAMBLISS, KINNETH M	1966
CHAVOUS, ARTHUR M.	1945
CHUANG, YING C.	1967
CORFIAS, JOHN C.	1967
COTRELL, CALVIN J.	1960
COTTON, GEORGE R.	1944
CROMER, CHALMERS A.	1970
CRUDDEN, PAUL B.	1944
DAINES, JAMES R.	1968
DANIELS, BLAIR E.	1937
DAS, RADHA C.	1950
DAVIDSON, JOHN E.	1968
DAVIS, WARREN C.	1936
DEADY, JOHN J.	1970
DELZAR, CHRISTIAN L.	1972
DILIBERTO, MENNO	1968
DUGGER, CECIL W.	1968
DUKES, GLENN F.	1969
DYER, PALMER E.	1970
EGGERS, JERRY R.	1970
EICHER, ROBERT S.	1968
ELLINGTON, MARK	1936
ELLIOTT, EARL S.	1967
ELMGREN JR, G. THEOD	1963
FAULDS, VINCENT R.	1956
FIELDING, MARVIN R.	1966
FISHER, RICHARD E.	1956
FLUCK, BRYAN V.	1970
FOLEY JR, JOHN P.	1968
FOSTER, ROBERT J.	1969
FRYE, ROYE M.	1963
FURLONG, JOHN	1957
GALLUP, LELLAND L.	1970
GAUTHIER, MICHAEL K.	1972
GIANINI, PAUL C.	1968
GILLIE SR, ANGELO C.	1967
GLAU, JON E.	1970
GOISHI, FRANK H.	1970
GORDON, KENNITH G.	1971
GORDON, KENNITH G.	1971
GRAY, KENNEY E.	1970
GREER, JOHN S.	1967
GUDITUS, CHARLES W.	1965
HACKETT, EDWARD V.	1967
HALES, JAMES A.	1972
HALL, JAMES F.	1954
HAMPTON, THOMAS E.	1950
HANCOX, FREDERICK J.	1969
HANSEN, EDITH H.	1972
HANSEN, RICHARD H.	1967
HANSSON, KENNETH S.	1966
HARLAN, OWEN	1953
HARRIS, EDWIN J.	1971
HENRY, GEORGE F.	1954
HERMAN, JAMES A.	1969
HILL, RICHARD E.	0
HINRICHS, ROY S.	04
HIRSCHI, HARVEY C.	1969
HOFER, JARREL	1969
HOLMEN, HOLGER E.	1969
HOLMES, LONNIE A.	1971
HOLT, IVIN L.	1972
HOPPER, CHARLES H.	1971
HOPPER, CHARLES H.	1971
HOUSKA, JOSEPH T.	1971
HOWE, TREVOR G.	1963
HULLMAN, DON H.	1971
HUNTER, ROBERT F.	1970
HYDE, ELDON K.	1968
IVES, QUAY D.	1971
JACKEY, DAVID F.	1933
JACKSON, THOMAS A.	1962
JENKINS, JOSEPH R.	1971
JOHNSON, DUANE A.	1972
JOHNSON, HARRY L.	1955
JOHNSON, LEONARD R.	1971
JOHNSON, WAYNE C.	1969
JOHNSTON, GARVIN H.	1968
JORDAN, KENNETH F.	1969
KARNES, JAMES B.	1966
KAVIEFF, MELVIN C.	1961
KAZANAS, HERCULES C.	1967
KEIM, WILLIAM E.	1966
KOEHLER, EVERETT E.	1959
KOHL, ERNEST O.	1949
KREJCIE, ROBERT V.	1968
KRUBECK, FLOYD E.	1954
KRUSKOP, LEROY L.	1969
LAMBERT, JAMES H.	1940
LAND, MING H.	1970
LAND, MING H.	1971
LANDIS, RUSSELL H.	1940
LANGERMAN, PHILLIP D	1968
LANGFORD, AL G.	1969
LANMAN, RICHARD W.	1953
LARSON, MILTON E.	1965
LAWS, NORMAN G.	1966
LEAVITT, MURRAY P.	1970
LEFFARD, WARREN L.	1968
LEVENSON, WILLIAM B.	1937
LEWIS, MYRON E.	1970
LINDEMEYER, RAY S.	1954
LITTLE, RICHARD L.	1968
LITTRELL, JOSEPH J.	1958
MANESS, MARION T.	1969
MANGANELLI, FRED D.	1959
MAXON, LLOYD M.	1970
MC CALLUM, HARRY N.	1967
MC CLURE, CLOIS A.	
MC CRACKEN, JOHN D.	1970
MC DOUGLE, LARRY G.	1971
MC ELHENY, JOHN R.	1960
MEHAIL, SPIRO	1971
MELLINGER, BARRY L.	1972
MELLINGER, BARRY L.	1972
MESSERSCHMIDT, DALE	1967
MEYERS, LARRY D.	1968
MIDILI, JOHN A.	1970
MILLER, AARON J.	1966
MILLER, MARK E.	1967
MOORE, LELAND B.	1970
MORGAN, DARYLE W.	1968
MORRISEY, THOMAS J.	1965
MUDZO, MICHAEL G.	1970
NEEDHAM, RAYMOND J.	1969
NESTEL, GERALD E.	1970
NESTOR, HAROLD M.	1971
NOLL, ROBERT F.	1967
NORRIS, MARSENA M.	1968
NORTON, ELIZABETH N.	1970
O TUEL, MAXCY B.	1969
OLSEN, EUGENE A.	1968
OLSON, HERBERT A.	1970
OUTCALT, RICHARD M.	1971
PATTERSON, JOHN R.	1970
PAWELEK, ALAN R.	1950
PERKINS, LAWRENCE H.	1967
PERKINS, NEAL B.	1962
PHALLEN, CHARLES W.	1958
PHILLIPS, DONALD S.	1968
PORTER, CHARLES B.	1957
PRATER, ROBERT L.	1962
PREITZ, CLARENCE H.	1969
PRICHARD, NEAL W.	1962
RAICHLE, HENRY F.	1969
REIMER, MILTON K.	1968
RELYEA, GLADYS M.	1937
RELYEA, GLADYS M.	1937
RIMLER, GEORGE W.	1969
ROBERTS JR, LEWIS	1972
ROBERTSON JR, LUTHER	1970
ROEDER, JOHN A.	1972
RONEY, MAURICE W.	1964
ROSIN, WILLIAM J.	1969
RUNNALLS, JAMES J.	1965
RYAN, ROBERT D.	1964
SALMON, DANIEL A.	1965

SALTEN, DAVID G.	1944
SANDBERG, NINA M.	1968
SEIDEL, JOHN J.	1951
SELMAN, JAMES W.	1967
SHAFER, CARL I.	1961
SHERRELL, EUGENE G.	1969
SHRADER, ROBERT F.	1967
SIMPSON, JAMES L.	1970
SLAPER, FRANK M.	1972
SLATTERY, RAYMOND A.	1969
SMITH, BRANDON B.	1968
SMITH, HERBERT E.	1940
SONNER, JAN R.	1972
SOURS, CHARLES F.	1969
SPAULDING, LLOYD F.	1971
SPRANKLE, NORMAN H.	1971
STALLINGS, DANIEL N.	1969
STAPLES, JAMES R.	1970
STEGEMAN, ARTHUR L.	1957
STEPHENS, GEORGE T.	1969
STEPHENSON, DONALD J	1970
STILLERMAN, MANUEL	1970
STONE, THOMAS C.	1969
STUART, WILLIAM R.	1972
SULLIVAN, THOMAS W.	1967
TATSCH, CLINTON E.	1970
TAYLOR JR, HOUSTON	1968
TAYLOR, FRANK C.	1970
THORPE, CLAIBURNE B.	1968
THORPE, CLAIBURNE B.	1968
TICHENOR, HAROLD D.	1967
TIERNEY, WILLIAM F.	1952
TIET, KATHERINE F.	1971
TREGO, JOHN W.	1958
TURNER, ROBERT E.	1957
VALENTINE, IVAN E.	1969
VAN DERSLICE, JOHN F	1967
VANDER LINDE, ALBERT	1971
VANHERCK, DON V.	1966
VASEK, RICHARD J.	1967
VON STROH, GORDON E.	1968
VYAS, PREMILA H.	1967
WALLACE, DONALD F.	1972
WARDWELL, WAYNE D.	1950
WEATHERS, RICHARD D.	1972
WEBER, EARL M.	1961
WEEDE, GARY D.	1967
WHITE, LELAND W.	1966
WHITNEY, LARRY J.	1967
WIGEN, RAY A.	1957
WILLEMS, ALVIN E.	1970
WILSON, ROGER J.	1970
WINNICK, ANDREW J.	1971
WINSEMAN JR, ALBERT	1969
WINTERS, KENNETH W.	1970
WOFFORD, THOMAS B.	1963
WOLD, KENNETH M.	1961
WOOLDRIDGE, ROBERT E	1961
ZWEIBEL, MALCOLM C.	1968

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ADELMAN, FRANK W.	1972
ALLEN, WILLARD A.	1963
ANDERSON, LOWELL D.	1969
ANDERSON, W. C.	1954
ANDREYKA, ROBERT E.	1969
ARNOLD, DANIEL S.	1968
ASHLEY, LAWRENCE F.	1936
BAAB, CLARENCE T.	1950
BAILEY, DONALD A.	1970
BAILEY, DONALD A.	1970
BAKAMIS, WILLIAM A.	1951
BAKER, GEORGE L.	1970
BALDWIN, THOMAS R.	1971
BARANYAI, WILLIAM A.	1955
BATESON, ROBERT E.	1951
BEARDEN, WILLIAM W.	1967
BEDNAR, ERNEST G.	1955
BEED, GALER W.	1970
BEKTON, WILLIAM E.	1965
BELL, CHARLES L.	1964
BENDIX, JOHN L.	1965
BENSON, WILLARD A.	1959
BERGENGREN JR, ROY F	1953
BOWMAN, JAMES E.	1958
BRANDON, GEORGE L.	1952
BRANTNER, SEYMOUR T.	1962
BRENCKLE, AUTHUR G.	1968
BRENNAN, THOMAS J.	1953
BRO, RONALD D.	1971
BROWN, ROBERT D.	1955
BRUCE, PHILLIP L.	1964
CAIN, CECIL R.	1958
CAIN, JOHN N.	1970
CALLEN, LOUIS J.	1952
CAMERON, WALTER A.	1969
CARLSEN, DARVEY E.	1961
CAULEY, MICHAEL J.	1971
CAULEY, MICHAEL J.	
CHAMPION, GEORGE	1965
CHARLESWORTH, KENNET	1968
CHATFIELD, WILLIAM D	1955
COLEMAN, JAY M.	1971
COLEMAN, WAYNE D.	1967
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COOVER, SHRIVER L.	1941
CORMACK, ROBERT B.	1970
CRIST, LEROY	1961
CROWDER, GENE A.	1968
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DAVIS, JIM L.	1966
DAWSON, KENNETH E.	1965
DEADY, JOHN J.	1970
DECK, WILLIAM L.	1955
DELZAR, CHRISTIAN L.	1972
DETWILER SR, WAYNE L	1971
DEVLIN, LEON G.	1971
DITLOW, GEORGE H.	1956
DOWNING, DALLAS L.	1941
DRAWDY, LARRY A.	1971
DRAZEK, STANLEY J.	1950
DUNCAN, GLENN S.	1950
DUNFEE, EMERY S.	1964
ECKER, LOUIS G.	1965
EDSALL, ALAN R.	1972
EDWARDS, LEONARD D.	1971
ENSMAN, LEO M.	1957
EPHRAIM, JOHN	1969
ERWIN, WILLIAM R.	1963
EVERSOLL, ROBERT I.	1971
FAGAN, BERNARD T.	1970
FAGAN, RAYMOND E. B.	1954
FAHRLANDER, DANIEL C	1972
FEIRER, JOHN L.	1946
FENDLASON, DONALD W.	1969
FOLEY JR, DENIS J.	1967
FORREST JR, LEWIS C.	1970
FOSS, MAURICE F.	1958
FRANKSON, CARL E.	1948
FRYE, BILL J.	1971
FURLONG, JOHN	1957
GALLINGTON, RALPH O.	1947
GAVIN, GORDON O.	1968
GELINA, ROBERT J.	1972
GERBER, RUSSELL L.	1966
GERBRACHT, CARLTON J	1949
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
GHEEN, WILLIAM L.	1970
GIACHINO, JOSEPH W.	1949
GIANINI, PAUL C.	1968
GIFFORD, KENNETH K.	1970

GILBERT, HAROLD G.	1955
GIMBEL, ARMIN F.	1953
GINTHER, RICHARD E.	1964
GLOGOVSKY, RONALD J.	1970
GREER, JOHN S.	1967
GRIFFIN, JAMES F.	1970
GUNDERSON, ORLEY D.	1971
GURBACH, THOMAS W.	1972
GYSLER, RANDOLPH L.	1971
HAGEN, DONALD L.	1972
HAHN, BRUCE J.	1953
HAMILTON, ALLEN T.	1941
HAMMACK, CHARLES R.	1967
HAMMOND, HOWARD R.	1971
HANKAMMER, OTTO A.	1936
HARDER, JACOB D.	1970
HARLAN, OWEN	1953
HARRIS, EDWIN J.	1971
HARRISON JR, PAUL E.	1955
HARTZON JR, WILEY G.	1972
HASTINGS, JAMES R.	1953
HEALAS, DONALD V.	1972
HEIN, EDWARD C.	1969
HELTON, H. L.	1958
HENRY, GEORGE F.	1954
HILL, CHARLES R.	1950
HILL, JOSHUA	1972
HISER, PAUL T.	1958
HOLMEN, HOLGER E.	1969
HOLT, IVIN L.	1972
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
HOUSE, ELAINE	1970
HUNTINGTON, HAROLD A	1940
HYDER, CARROLL R.	1971
JACKEY, DAVID F.	1933
JACKMAN, DUANE A.	1961
JAMES, WILLIAM E.	1971
JANZEN, JOHN W.	1971
JELDEN, DAVID L.	1960
JENKINS, JOSEPH R.	1971
JENNINGS, GERALD L.	1968
JOHNSON, RAYMOND C.	1971
JOHNSON, ROBERT I.	1958
JOHNSON, RUFUS G.	1949
JOHNSTON, GARVIN H.	1968
JONES, GUY R.	1971
KARR, DONALD L.	1969
KENNEKE, LARRY J.	1968
KERWOOD, ROBERT V.	1967
KING, FRANKLIN J.	1970
KIRBY, JACK	1965
KIST, KEVIN W.	1970
KLABENES, ROBERT E.	1971
KOEHLER, EVERETT E.	1959
KOHLER, RICHARD C.	1951
KOHLER, RODERICK G.	1952
KOO, PO-YEN	1968
KRUGER, JOHN M.	1971
KUETEMEYER, VINCENT	1972
KURTH, EDWIN L.	1955
KYNARD, ALFRED T.	1960
LAMBERT, JAMES H.	1940
LANDIS, RUSSELL H.	1940
LAPIDUS, GEORGE	1954
LAPPIN, ALVIN R.	1958
LARSON, CURTIS G.	1971
LARSON, IRVING W.	1969
LAUDA, DONALD P.	1966
LEASE, ALFRED A.	1964
LEAVITT, WILLIAM C.	1969
LEE, RAPHEL D. C.	1972
LINDAU, ORA F.	1968
LOATS, HENRY A.	1950
LOW, FRED G.	1963
LUCY, JOHN H.	1971
LUX, DONALD G.	1955
MALLARY, BENJAMIN E.	1932
MANESS, MARION T.	1969
MANSFIELD, ROBERT T.	1959
MARBURGER, EDWARD F.	1948
MAUER, DONALD E.	1966
MAW, JAMES L.	1971
MC CRACKEN, JOHN D.	1970
MC KEE, RONALD R.	1971
MELLMAN, ROBERT A.	1957
MESSERSCHMIDT, DALE	1967
MILLER, DUDLEY B.	1965
MILLER, JAMES A.	1971
MILLS, EARL S.	1971
MILLS, EARL S.	1971
MINELLI, ERNEST L.	1957
MINTON, GENE D.	1968
MITCHELL, JOHN	1954
MOELLER, CARL A.	1961
MONROE, H. B.	1960
MONTELEONE, THOMAS I	1952
MOONEY, JAMES J.	1967
MORELAND JR, HENRY C	1970
MORGAN, J. B.	1961
MOSLEY, SAMUEL N.	1970
MUSGROVE, WILLIAM R.	19
NAIR, RALPH K.	1950
NELSON, A. FRANK	1955
NICHOLS, DWIGHT W.	1955
NIELSEN, ERWIN E.	1969
NOVOSAD, JOHN P.	1971
O NEILL, JOHN N.	1971
OLIVER, WILMOT F.	1967
OLIVER, WILMOT F.	1967
OLIVER, WILMOT F.	1967
OLSEN, GEORGE A.	1971
OLSON, JERRY C.	1964
OLSON, RICHARD P.	1971
ORR, RALPH O.	1970
OUTCALT, RICHARD M.	1971
PAGE, CHARLES B.	1953
PALMER, HAROLD G.	1950
PARKS, DARRELL L.	1968
PARKS, GERALD A.	1969
PAWELEK, ALAN R.	1950
PAWELEK, STANLEY J.	1941
PAYNE, AM V.	1965
PEITHMAN, ROSCOE E.	1955
PFAHL, ALVIN K.	1971
POLESZAK, LEONARD J.	1969
POLETTE, DOUGLAS L.	1972
POWELL, PAUL E.	1954
POWER, ANDREW T.	1955
POWERS, G. PAT	1961
PROCTOR, BERNARD S.	1950
QUICK, OTHO J.	1954
RALSTROM, STIG E.	1969
RAU, GERALD N.	1971
RAY, J. EDGAR	1944
REAMS, JAKE W.	1963
REED, WILLIAM T.	1947
REESE, ROBERT M.	1954
REID, DEMPSEY E.	1956
RESSLER, RALPH	1966
ROBERTS JR, LEWIS	1972
ROBERTS, NORMAN N.	1967
ROBINSON, FRANK E.	1955
ROEDER, JOHN A.	1972
RUDISILL, ALVIN E.	1969
RUSSELL, ELLSWORTH M	1950
RUSSELL, GENE H.	1970
RUTHERFORD, WILLIAM	1962
RYAN, CHESTER M.	1963
RYAN, JAMES E.	1964
SANDERS, LEROY J.	1967
SARGENT, WILLIAM T.	1956
SAYOVITZ, JOSEPH J.	1955
SCHAEFER, CARL J.	1959
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SCHMITT, CARLOS R.	1971
SCHRAG, MARIE C.	1972
SCOBEY, MARY-MARGARE	
SCOTT, CHARLES P.	1943

SECHREST, CHARLES H.	1953
SENTENEY, GEORGE W.	1955
SEXTON, WILLIAM E.	1965
SHACKELFORD, RICHARD	
SHRADER, ROBERT F.	1967
SILVIUS, HAROLD G.	1946
SIMONS, JEROLD J.	1967
SINGLETARY, THOMAS A	1968
SIRO, EINAR E.	1949
SMITH, IRVING G.	1969
SNITZ, RUBEN H.	1931
SOURS, CHARLES F.	1969
SPAZIANI, RICHARD L.	1972
SPRECHER, ROBERT E.	1970
STEPHENSON, LESLIE E	1958
STEVENSON, JAMES E.	1953
STONER, WILLIAM D.	1940
STOUGH, KENNETH F.	1968
STUTEVILLE, CLAUDE E	1971
SUNDIN, ROBERT L.	1971
SUTTON, FRED C.	1961
TAYLOR JR, HOUSTON	1968
THATCHER, GLENN M.	1970
THOMAS, HENRY L.	1971
THOMPSON, GUERN K.	1971
THORNTON, ROBERT W.	1971
TIMPER, HANS E.	1972
TOWERS, EDWARD R.	1956
TSUJI, THOMAS T.	1967
VAN BENSCHOTEN, RAYM	1971
VAUGHN, MAURICE S.	1967
VOLK, VINCENT A.	1955
WALLIS, DONALD E.	1965
WALSH, JOHN P.	1958
WARGO, WILLIAM D.	1968
WATKINS, KENNETH E.	1966
WEBER, EARL M.	1961
WEINER, DONALD A.	1971
WIERSTEINER, SAMUEL	1970
WILBER, GEORGE O.	1941
WILLIAMS, WILLIAM A.	1959
WILLIS, GEORGE E.	1972
WILSON, ROGER J.	1970
WILSON, WADE	1954
WINDHAM, BILLY L.	1972
WINTERS, KENNETH W.	1970
WINTERS, KENNETH W.	1970
WOLANSKY, WILLIAM D.	1968
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BARICH, DEWEY F.	1961
BEATTY, CHARLES J.	1967
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CALEY, PAUL C.	1969
CUMMINGS, LAWRENCE J	1969
FECIK, JOHN T.	1970
FOSTER, ROBERT J.	1969
FRITZ, ROBERT C.	1960
GAILEY, DAVID S.	1969
GALLUP, LELLAND L.	1970
GRAY, THOMAS E.	1970
GYSLER, RANDOLPH L.	1971
HALFIN, HAROLD H.	1973
HAMPTON, THOMAS E.	1950
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HAUSER, ROGER E.	1971
HUNTER, ROBERT F.	1970
JENKINS, REESE V.	1966
KAPLAN, WILLIAM A.	1970
KEIM, LAWRENCE	1966
KRAFT, RICHARD H.	1967
KURIEN, CHEMPALATHAR	1967
LARSON, DELMAR L.	1964
MANGANELLI, FRED D.	1959
MAUER, DONALD E.	1966
METZLER, JOHN H.	1970
MIDILI, JOHN A.	1970
MILLER, MARK E.	1967
MONGERSON, MARTIN D.	1968
MORGAN, DARYLE W.	1968
NAUBAUER, GERHARDT W	1956
OLSON, DELMAR W.	1957
ORLANDO, FRANK J.	1972
OTTERSON, PEDER A.	1969
PIERSALL, ARNOLD C.	1964
QUIER, GEORGE T.	1969
RAY, REX E.	1966
RELYEA, GLADYS M.	1937
RINEHART, RICHARD L.	1966
RUNNALLS, JAMES J.	1965
SANDBERG, NINA M.	1968
SHARMA, BALDEV R.	1967
SHEPARD, JON M.	1968
SIMONS, JEROLD J.	1967
SONNY, JACOB	1971
STADT, RONALD W.	1962
STEPHENSON, DONALD J	1970
STROM, IRVING E.	1970
TREGILGUS, EARL P.	1954
VAN GIGCH, JOHN P.	1968
WRIGHT, JERAULD B.	1969
ZAREISN, SOLEIMAN	1969

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AUTHOR	DATE
BARON, ANDREW W.	1968
BETTIS, LLOYD E.	1971
BURSE SR, LUTHER	1969
CAIN, JOHN N.	1970
CAMPBELL, GORDON	1969
CHRISMAN, JOSEPH P.	1970
DAWSON, KENNETH E.	1965
DILIBERTO, MENNO	1968
EHRENBURG, JOHN D.	1963
FAGAN, BERNARD T.	1970
FERNS, GEORGE W.	1962
FINKELSTEIN, ABRAHAM	1959
FRANCHAK, STEPHEN J.	1971
GAINES, THOMAS R.	1955
GIACHINO, JOSEPH W.	1949
GIANINI, PAUL C.	1968
GROTE, CHARLES N.	1960
GRUNWALD, WALTER	1968
HAHN, MARSHALL S.	1967
HAMMACK, CHARLES R.	1967
HARRISON JR, PAUL E.	1955
JAMES, CALVIN E.	1963
JANZEN, JOHN W.	1971
JENKINS, JOHN D.	1969
JONES, CHARLES I.	1967
KAGY, FREDERICK D.	1959
KOHLER, RICHARD C.	1951
LOEPP, FRANZIE L.	1970
MANSFIELD, ROBERT T.	1959
MONROE, H. B.	1960
MORGAN, J. B.	1961
MORRILL, DAVID	1970
MUSGROVE, WILLIAM R.	19
NELSON, HILDING E.	1962
NELSON, HOWARD F.	1953
OAKS, MERRILL M.	1970
OLIVER, WILMOT F.	1967

ORR, WILLIAM H.	1970
PFAHL, ALVIN K.	1970
POLESZAK, LEONARD J.	1969
POWERS, G. PAT	1961
RALSTROM, STIG E.	1969
RAY, REX E.	1966
REBHORN, ELDON A.	1972
REESER, GEORGE W.	1971
REPP, VICTOR E.	1970
RISHER, CHARLES G.	1953
ROKUSEK, H. J.	1964
RUITER, WILLIAM W.	1971
RUMMELL, WINFIELD R.	1971
SCHERER, HARLAN L.	1960
SEEFIELD, KERMIT A.	1949
STANFIELD, FOSTER A.	1971
STANFIELD, FOSTER A.	1971
SULLIVAN, FRANK V.	1964
SUMTER, PAUL E.	1969
SWERDLOW, ROBERT M.	1969
WALKER, JOE W.	1970
WARZECHA, EVERETT R.	1972
WILLIAMS III, WALTER	1963

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ANDERSON, EDWARD T.	1970
ARMSTRONG, KENNETH E	1971
ASHLEY, JACKSON W.	1971
BECK, JOHN R.	1964
BIEWALD, EDWARD C.	1969
BLUM, ROBERT E.	1965
BOX SR, MARSHALL R.	1967
BRAUN, ROBERT W.	1971
BROWN, WALTER E.	1971
BURDETTE JR, WALTER	1955
BYROM, JOHN M.	1957
CASSIDY, EDWARD A.	1953
CHAMBERLAIN, DUANE G	1954
CLAWSON, LA VERE E.	1967
COBURN, JAMES M.	1969
COLGAN, FRANCIS E.	1967
COLLONS, RODGER D.	1967
COMER, JOHN C.	1970
COZZENS, CHARLES R.	1965
CRAWFORD, JOHN E.	1941
DAINES, JAMES R.	1968
DEMPSEY, DON G.	1972
DILIBERTO, MENNO	1968
DUENK, LESTER G.	1966
EHRENBORG, JOHN D.	1963
FACE, WESLEY L.	1963
FLUEGGE, LYNN R.	1972
FRANCHAK, STEPHEN J.	1971
GALLINGTON, RALPH O.	1947
GISRIEL, AUSTIN E.	1959
GOLDMAN, ROBERT C.	1971
GRANEY, MAURICE K.	1942
HACKETT, EDWARD V.	1967
HARRIS, RICHARD	1970
HARRIS, ROBERT C.	1970
HASH, JOHN A.	1969
HENDRIX, WILLIAM F.	1967
HENNIG, JAMES F.	1970
HERRING, TOD H.	1962
HILL, EDWIN K.	1968
HILL, JOSHUA	1972
HOFER, JARREL	1969
HOLM, MELVIN G.	1972
HULLE, WILLIAM A.	1972
JOHNSON, DOUGLAS H.	1969
KOUTNIK, PAUL G.	1968
LANMAN, RICHARD W.	1953
LEMONS, CLIFTON D.	1965
LOEPP, FRANZIE L.	1970
LOPEZ, DANIEL C.	19
LYONS, RICHARD A.	1969
MASSEY, HAL	1965
MC VICKER, HOWARD E.	1970
MORGAN SR, LEO D.	1966
MUDGETT, ALBERT G.	1958
MURPHY, JAMES O.	1972
NEWKIRK, LOUIS V.	1929
PERKINS, NEAL B.	1962
PETER, RICHARD F.	1970
PRATZNER, FRANK C.	1969
SALTEN, DAVID G.	1944
SANDMAN, CHARLES W.	1969
SHORE JR, THOMAS C.	1970
SILVER, HARVEY A.	1967
STANGL, OTTO A.	1968
STEPHENS, GEORGE T.	1969
STOKES, VERNON L.	1971
SWANSON, RICHARD A.	1968
TURNER, MERVYN L.	1968
WALLACE, NORMAN E.	1968
WARRICK, GLENN D.	19
WIGHTWICK, BEATRICE	1949
WILCOX, T. GLADE	1957
WRIGHT, LAWRENCE S.	1954
WYNN, PHILIP D.	1970
YOUNG, DARIUS R.	1968

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AUTHOR	DATE
ADAMS, AARON F.	1961
ALKAN, OMER C.	1969
BARLOW, MELVIN L.	1949
BATESON, ROBERT E.	1951
BECK, RICHARD W.	1971
BOWMAN, ERNEST L.	1932
BOWSER, JAMES A.	1960
BROWN, MILTON T.	1948
CASSIDY, EDWARD A.	1953
CHAMBLISS, KINNETH M	1966
CONLEY, FRANKLIN	1968
COOKE, ROBERT L.	1932
CRABTREE, JAMES S.	1967
CRUMPTON, CHARLES R.	1952
DOERR, JOHN J.	1967
DOWNING, DALLAS L.	1941
DROST, JIM L.	1970
EARHART, CECILIA R.	1946
EDMUNDS, NIEL A.	1969
EDSALL, ALAN R.	1972
ELLINGTON, MARK	1936
ENGLISH, ROBERT W.	1950
ESTABROOKE, EDWARD C	1939
FAGAN, BERNARD T.	1970
FURLONG, JOHN	1957
GRAINGE, FLOYD M.	1967
GUNDERSON, B. HARRY	1949
GUNDERSON, ORLEY D.	1971
HALL, JAMES F.	1954
HAMILTON, ALLEN T.	1941
HAMMER, GARLAND G.	1951
HAMMOND, HOWARD R.	1971
HANEY, PHILIP H.	1949
HARPER, HERBERT D.	1934
HARRIS, RICHARD	1970
HERMAN, JAMES A.	1969
HOERNER, JAMES L.	1969
JABBARI, EBRAHIM G.	1972
JACKEY, DAVID F.	1933
JOCHEN, ALBERT E.	1947

JOHNSON, ELOUISE E.	1967
JOHNSTON, RICHARD E.	1971
KARR, DONALD L.	1969
KIGIN, DENIS J.	1959
KJOS, OSCAR E.	1954
KOHLER, RODERICK G.	1952
KYNARD, ALFRED T.	1960
LAND, SAMUEL L.	1931
LAUDA, DONALD P.	1966
LEONARD, REGIS L.	1950
MALLARY, BENJAMIN E.	1932
MATTSON, HOMER A.	1970
MC KELL, WILLIAM E.	1970
MELLMAN, ROBERT A.	1957
MENEGAT, PAUL A.	1953
MINTON, GENE D.	1968
MONEY, HOMER E.	1956
MORGAN, DARYLE W.	1968
MOUTOUX, ALFRED C.	1948
OAKLEY, HUGH L.	1954
OLSEN, EDWARD G.	1937
ORR, RALPH O.	1970
OUTCALT, RICHARD M.	1971
OXLEY, VINCENT E.	1969
PEARSON, WILLIAM W.	1967
PRICE, DENNIS H.	1955
REESE, ROBERT M.	1954
RINCK, JOE A.	1968
ROSIN, WILLIAM J.	1969
RUBIN, MORRIS M.	1950
RYAN, CHESTER M.	1963
SCHILL, WILLIAM J.	1961
SCHURE, ALEXANDER	1950
SEARS JR, WILLIAM P.	1930
SEIDEL, JOHN J.	1951
SHOEMAKER, BYRL R.	1957
SOMMERFELD, DONALD A	1969
SPINTI, ROBERT J.	1968
STRONG, MERLE E.	1958
TATE, HAROLD S.	1951
TURNER, ERWIN	1958
URGELL, FRANCISCO C.	1941
VAN BENSCHOTEN, RAYM	1971
VAN DUSEN, EDWARD B.	1948
VAN DOT, BENJAMIN H.	1932
WALDORF, ROBERT J.	1971
WALDORF, ROBERT J.	1971
WALSH, JOHN P.	1958
WASDEN, JED W.	1968
WHITE, DAVID L.	1973
WILCOX, T. GLADE	1957
WILLIAMS, WILLIAM A.	1959
ZANKOWICH, PAUL	1956

TOOL

AUTHOR	DATE
BONDE, ROBERT G.	1964
DOUTT, RICHARD F.	1965
HANSEN, RUSSELL G.	1964
LAPPIN, ALVIN R.	1958
LINTON, JOHN A.	1951
SHEFFIELD, EVERETT A	1969
SMITH, EARL M.	1971
VAN TASSEL, RAYMOND	1948

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AUTHOR	DATE
ALLEN, WILLARD A.	1963
BATES, IVAN W.	1971
COBURN, JAMES M.	1969
KLEINTJES, PAUL L.	1953
LOCKE, LEWIS A.	1969
MARBURGER, EDWARD F.	1948

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AUTHOR	DATE
AL-BUKHARI, NAJATI M	1968
ANDERWALD, CARL J.	1947
ATTEBERRY, PAT H.	1954
BADER, LOIS	1932
BAKER, ALFRED E.	1943
BASSERI, JAMSHID	1970
BATES, IVAN W.	1971
BEDWELL, NORMAN W.	1951
BIBB, HERMAN L.	1952
BOXX, WILLIAM R.	1972
BROPHY, JOHN M.	1947
BROTHERTON, WILLIAM	1964
BROWN, WALTER C.	1954
COCHRAN, GEORGE C.	1967
CRUDDEN, PAUL B.	1944
CUTLER, THEODORE H.	1948
DANAHER, EUGENE I.	1946
DANAHER, EUGENE I.	1946
EARHART, CECILIA R.	1946
EVANCHO, MICHAEL	1947
FAULDS, VINCENT R.	1956
FLAHERTY, HUGH	1944
FOLTMAN, FELICIAN F.	1950
FRYE, ROYE M.	1963
FRYKLUND, VERNE C.	1933
GHEEN, W. LLOYD	1970
GOSSAGE, LOYCE C.	1967
GRANDCHAMP, ROBERT J	1971
HACKETT, EDWARD V.	1967
HALL, JAMES F.	1954
HAMILTON, ALLEN T.	1941
HARPER, HERBERT D.	1934
HASKELL, ROGER W.	1969
HEARN, ARTHUR R.	1948
HEEP, RICHARD H.	1939
HUBBARD, LOUIS H.	1930
IACOBELLI, JOHN L.	1969
JOHNSON, MARVIN E.	1959
JULIAN, LESTER J.	1953
KAPLAN, HAROLD	1956
KURTH, EDWIN L.	1955
LAND, SAMUEL L.	1931
LEVENSON, WILLIAM B.	1937
LINDAHL, LAWRENCE G.	1944
LITTLE, RICHARD L.	1968
MC DOWELL, LEONARD C	1964
MUSGROVE, WILLIAM R.	19
NICHOLS, JACK D.	1970
OGUNNIYI, OMOTOSHO	1969
PAWELEK, ALAN R.	1950
PEDERSEN, GEORGE L.	1957
PORTER, HAROLD W.	1948
PRICE, DENNIS H.	1955
RELYEA, GLADYS M.	1937
ROSENQUIST, BARBARA	1971
SHEFFIECK JR, CHARLE	1969
SMITH, FARMER S.	1969
SNOW, JOHN W.	1966
SORENSEN, RONALD L.	1964
STEGEMAN, ARTHUR L.	1957
TIERNEY, WILLIAM F.	1952
TREGILGUS, EARL P.	1954
TURNER, ERWIN	1958
WALKER, LLOYD R.	1946
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DAS, RADHA C.	1950
GERBRACHT, CARLTON J	1949
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GREER, JOHN S.	1967
HALL, CLYDE W.	1953
HAMILTON, ALLEN T.	1941
HAMMOND, ROBERT G.	1956
KRUMBIEGEL, WALTER O	1955
LAMBERT, JAMES H.	1940
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MAC LEAN JR, C. B.	1963
MAHONEY, JAMES H.	1956
MC CLEARY, JOSEPH L.	1967
MILLER, DUDLEY B.	1965
MONROE, LYNNE C.	1939
OSBURN, BURL N.	1939
RINEHART, RICHARD L.	1966
ROBINSON, JAMES W.	1967
SAYOVITZ, JOSEPH J.	1955
SCHORLING, HORACE O.	1950
SHAFER, CARL I.	1961
SIMONS, ROBERT M.	1969
SMITH, HERBERT E.	1940
SREDL, HENRY J.	1964
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TATE, HAROLD S.	1951
TRICHE JR, ANDREW	1933
USDANE, WILLIAM M.	1955
VALENTINE, IVAN E.	1969
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VORE

AUTHOR	DATE
ALLEN, JAY M.	1967
ANDERSON, RAY N.	1932
BARNETTE JR, W. L.	1949
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BRITT, ROBERT D.	1966
BURRIS, WAITUS R.	1967
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JENSEN, THOMAS R.	1968
WOODEN, RALPH L.	1956

DEYH - HIED

AUTHOR	DATE
CANDOLI, I. C.	1967
REED, WILLIAM T.	1947

DPOT - EXCD

AUTHOR	DATE
CLARK, JAMES V.	1967
FRAZIER, WILLIAM D.	1966

DPOT - VOED

AUTHOR	DATE
BOWSER, JAMES A.	1960
CLARK, JAMES V.	1967
FALKENSTINE, JAMES C	1965
FRAZIER, WILLIAM D.	1966
FRYE, RONALD M.	1962
GADBOIS, ROBERT L.	1968
GILBREATH, TOMMY D.	1971
GILBREATH, TOMMY D.	1971
MOSS, JOHN E.	1962
SILVER, HARVEY A.	1967
WHITE, LELAND W.	1966

DRAF - CPTR

AUTHOR	DATE
BARBER, CARL S.	1967
BASS, RONALD E.	1971
CASE, MERL E.	1971
HILL, CLAIR S.	1971

DRAF - IND.

AUTHOR	DATE
BENJAMIN, NEAL B.	1969
CASE, MERL E.	1971
GIETL, RUDY E.	1971
RANDEL, STEPHEN V.	1957

EQIP - FACP

AUTHOR	DATE
KLEHM, WALTER A.	1937
MC GAW, SIDNEY E.	1952
ROSS, RAYMOND J.	1966
WINEGAR, GARY H.	1969

EVPR TEED

AUTHOR	DATE
ASHLEY, LAWRENCE F.	1936
BAKER, GEORGE L.	1970
BALDWIN, THOMAS R.	1971
BELL, CHARLES L.	1964
BRANTNER, SEYMOUR T.	1962
BRO, RONALD D.	1971
BRUCE, PHILLIP L.	1964
CAIN, CECIL R.	1958
CALLEN, LOUIS J.	1952
CARLSEN, DARVEY E.	1961
CHATFIELD, WILLIAM D	1955
COLEMAN, JAY M.	1971
COLEMAN, WAYNE D.	1967
DEVLIN, LEON G.	1971
DUNCAN, GLENN S.	1950
ECKER, LOUIS G.	1965
EDWARDS, LEONARD D.	1971
EPHRAIM, JOHN	1969
ERWIN, WILLIAM R.	1963
FAGAN, BERNARD T.	1970
FRANKSON, CARL E.	1948
GALLINGTON, RALPH O.	1947
GAVIN, GORDON O.	1968
GIFFORD, KENNETH K.	1970
GINTHER, RICHARD E.	1964
HANKAMMER, OTTO A.	1936
HARRIS, EDWIN J.	1971
HELTON, H. L.	1958
HILL, CHARLES R.	1950
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
HUNTINGTON, HAROLD A	1940
HYDER, CARROLL R.	1971
JACKEY, DAVID F.	1933
JOHNSON, RAYMOND C.	1971
KERWOOD, ROBERT V.	1967
KLABENES, ROBERT E.	1971
KOHLER, RODERICK G.	1952
KOO, PO-YEN	1968
LAPPIN, ALVIN R.	1958
LINDAU, ORA F.	1968
LOATS, HENRY A.	1950
MANSFIELD, ROBERT T.	1959
MARBURGER, EDWARD F.	1948
MILLER, JAMES A.	1971
MILLS, EARL S.	1971
MILLS, EARL S.	1971
MITCHELL, JOHN	1954

MORELAND JR, HENRY C	1970
NAIR, RALPH K.	1950
NIELSEN, ERWIN E.	1969
PAWELEK, STANLEY J.	1941
POLESZAK, LEONARD J.	1969
PROCTOR, BERNARD S.	1950
REESE, ROBERT M.	1954
REID, DEMPSEY E.	1956
ROEDER, JOHN A.	1972
RUDISILL, ALVIN E.	1969
SARGENT, WILLIAM T.	1956
SEXTON, WILLIAM E.	1965
SIMONS, JEROLD J.	1967
SINGLETARY, THOMAS A	1968
STEPHENSON, LESLIE E	1958
STONER, WILLIAM D.	1940
SUNDIN, ROBERT L.	1971
TIMPER, HANS E.	1972
TOWERS, EDWARD R.	1956
WALLIS, DONALD E.	1965
WEINER, DONALD A.	1971
WILBER, GEORGE O.	1941
WILLIAMS, WILLIAM A.	1959
WINTERS, KENNETH W.	1970
WOMMACK, CHARLES H.	1967

EVFA - TEEF

AUTHOR	DATE
CAIN, JOHN N.	1970
EHRENBORG, JOHN D.	1963
GIANINI, PAUL C.	1968
HAMMACK, CHARLES R.	1967
LOEPP, FRANZIE L.	1970
OLIVER, WILMOT F.	1967
OLIVER, WILMOT F.	1967
WILLIAMS III, WALTER	1963

EVPN - ATTD

AUTHOR	DATE
BALL, JOHN E.	1971
DOELLINGER, KEITH E.	1971
ELLIOTT, BURTON L.	1971
EPSTEIN, JACK H.	1971
GALLOWAY, JOEL D.	1972
GISRIEL, AUSTIN E.	1959
HANSEN, EDITH H.	1972
HEALAS, DONALD V.	1972
HOERNER, HARRY J.	1969
JONES, GUY R.	1971
KAISER, RONALD E.	1971
KREPEL, WAYNE J.	1967
LE BLANC, DARRELL R.	1971
LYBARGER, ALVIN E.	
MILNOR, BRENT T.	1971
MONROE, ALLEN L.	1970
MUND, RICHARD G.	1970
NICHOLS JR, GEORGE V	1971
REBHORN, ELDON A.	1972
ROBERTS, EDWARD R.	1971
STANFIELD, FOSTER A.	1971
WALDORF, ROBERT J.	1971
WINDHAM, BILLY L.	1972
WOODS, WILLIAM H.	1971

EVPR - GRAD

AUTHOR	DATE
BALDWIN, THOMAS R.	1971
DEVLIN, LEON G.	1971
DEVLIN, LEON G.	1971
MILLS, EARL S.	1971
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970

EVST - ELEL

AUTHOR	DATE
FOLEY JR, JOHN P.	1968
GARNER, CAREY C.	1969
LYONS, RICHARD A.	1969
SMITH, BRANDON B.	1968

EXCD - METH

AUTHOR	DATE
BAUGRUD, KIM J.	1968
BENDER, MICHAEL	1971
BLAND, LARSON M.	1972
JACKMAN, DUANE A.	1961
NOTHDURFT, MARIE E.	1972
OLSON, DAVID O.	1969

EXPR - GUID

AUTHOR	DATE
GOFF, WILLIAM H.	1967

EXPR - PROB

AUTHOR	DATE
BABCOCK, JAMES G.	1969
BRENNER, CHARLES J.	1968
CORNWELL, RAYMOND L.	1961
EASTON, CLIFFORD W.	1971
HOLT, IVIN L.	1972
LINDEMEYER, RAY S.	1954
ROWLETT, JOHN D.	1960
SAGE, JAMES E.	1971

EXPR - MNIP

AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ARVEY, RICHARD D.	1970
AUER, HERBERT J.	1971
BAKER, NORMAN A.	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BOUTWELL JR, COLEN J	1971
CHASTAIN, GARY K.	1972
COOVER, SHRIVER L.	1941
GEDEON, DAVID V.	1971
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HENAK, RICHARD M.	1971
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JENKINS, JOHN D.	1969
JOLLY, FRANK H.	1970
KIEFT, LEWIS D.	1970
KRUPPA, RICHARD A.	1970
LARUE, JAMES P.	1968
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MEERS, GARY D.	1972
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NORTON, ROBERT E.	1967
PRITCHARD, WILLIAM C.	1937
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

EXPR - SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENDER, MICHAEL	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
CHASTAIN, GARY K.	1972
EASTON, CLIFFORD W.	1971
GEDEON, DAVID V.	1971
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HENAK, RICHARD M.	1971
HEYEL, CLARENCE L.	1967
HOFER, ARMAND G.	1963
HUDSON, DONALD W.	1972
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JOLLY, FRANK H.	1970
KIEFT, LEWIS D.	1970
LARUE, JAMES P.	1968
LINDAHL, LAWRENCE G.	1944
MANCHAK, PAUL J.	1965
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MEERS, GARY D.	1972
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NORTON, ROBERT E.	1967
OLSON, DAVID O.	1969
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SCHACHT, ROBERT C.	1971
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WAISNER, GARY L.	1970
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

GRAD - I.A.

AUTHOR	DATE
FEIRER, JOHN L.	1946
HENRY, GEORGE F.	1954
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970
WIGEN, RAY A.	1957

HIED - I.A.

AUTHOR	DATE
ALLEN, WILLARD A.	1963
BAAB, CLARENCE T.	1950
BAKAMIS, WILLIAM A.	1951
BALL, JOHN E.	1971
BATESON, WILLARD M.	1954
BENDIX, JOHN L.	1965
BOYDEN, LLOYD R.	1972
CARLSEN, DARVEY E.	1961
COLEMAN, JAY M.	1971
CRIST, LEROY	1961
CUMMINS, CARL C.	1957
DARDEN, BYRNES L.	1951
DECKER, GEORGE C.	1943
DIRKSEN, DENNIS A.	1969
EDWARDS, LEONARD D.	1971
FEIRER, JOHN L.	1946
GAVIN, GORDON O.	1968
GHEEN, W. LLOYD	1970
GIFFORD, KENNETH K.	1970
GINTHER, RICHARD E.	1964
GRAHAM, GREGORY S.	1971
HANKAMMER, OTTO A.	1936
HAWKINS, LESLIE V.	1953
HENRY, GEORGE F.	1954
HISER, PAUL T.	1958
JACKSON, PETER A.	1965
JOHNSON, RAYMOND C.	1971
KIRKWOOD, JAMES J.	1970
KIST, KEVIN W.	1970
KURTH, EDWIN L.	1955
LARSON, IRVING W.	1969
MALEY, DONALD	1949

MESSMAN, WARREN B.	1963
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
MORELAND JR, HENRY C	1970
NELSON, REX A.	1963
O DELL, ROBERT D.	1963
O NEILL, JOHN N.	1971
O NEILL, JOHN N.	1971
PERSHING, REX W.	1970
PIERSALL, ARNOLD C.	1964
REAMS, JAKE W.	1963
REID, DEMPSEY E.	1956
ROBERTS, NORMAN N.	1967
SILVIUS, HAROLD G.	1946
STONER, WILLIAM D.	1940
THOMPSON, BRUCE L.	1971
TORRES, LEONARD	1963
TUCKER, CASEY A.	1965
VACEK, WILLIAM L.	1962
VAUGHN, MAURICE S.	1967
WARGO, WILLIAM D.	1968
WEBER, EARL M.	1961
WIED, ALEXANDER F.	1972
WIGEN, RAY A.	1957
WINTERS, KENNETH W.	1970
ZOPPETTI, MATTHEW	1970

HIED - MNIP

AUTHOR	DATE
ARVEY, RICHARD D.	1970
AUER, HERBERT J.	1971
GIMBEL, ARMIN F.	1953
MC EOWEN, ROBERT H.	1967

HIED - SKIL

AUTHOR	DATE
GIMBEL, ARMIN F.	1953

INPG - CNST

AUTHOR	DATE
BERGSTROM, PHILIP G.	1970
HAYNES, LUTHER J.	1956
KUWIK, PAUL D.	1970
PETER, RICHARD F.	1970
WEST, WILLIAM E.	1969
YOUNG, DARIUS R.	1968

ININ - MNIP

AUTHOR	DATE
FLUG, EUGENE R.	1967
HOFER, ARMAND G.	1963
KASSAY, JOHN A.	1970
MC EOWEN, ROBERT H.	1967
NORTON, ROBERT E.	1967
WOMACK, WILLIAM M.	1971

INSD - MNIP

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
GRUNWALD, WALTER	1968
HERR, JAMES F.	1970
HURLEY, CARL E.	1971

INSD - SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
GRUNWALD, WALTER	1968
HURLEY, CARL E.	1971
LICHTBLAU, LEONARD R	1958
NISH, DALE L.	1967

INSM - MNIP

AUTHOR	DATE
HAILES, CHARLES W.	1971
RILEY, JOHN N.	1972

INSM - SKIL

AUTHOR	DATE
HAILES, CHARLES W.	1971
LICHTBLAU, LEONARD R	1958
RILEY, JOHN N.	1972

INSR - IND.

AUTHOR	DATE
ADAMS, AARON F.	1961
COCHRAN, GEORGE C.	1967
CUTLER, THEODORE H.	1948
DIRKSEN, RALPH E.	1969
ESTLE, EDWIN F.	1966
FURIA, JOHN J.	1930
GEHRING, GLEN S.	1969
LINE, JOHN D.	1971
ROSENQUIST, BARBARA	1971
SCHMITT, VICTOR A.	1953
WHEELER, EDWARD A.	1965

MAIN - EQIP

AUTHOR	DATE
CUNNINGHAM, BERYL M.	1952
MC ARTHUR, ROSS J.	1955

MEDA — MNIP

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
BOUTWELL JR, COLEN J	1971
CHASTAIN, GARY K.	1972
FLUG, EUGENE R.	1967
HERR, JAMES F.	1970
HURLEY, CARL E.	1971
JENKINS, JOHN D.	1969
MEERS, GARY D.	1972
RAPHAEL, MICHAEL A.	1971
RILEY, JOHN N.	1972
SNYDER, VANCE B.	1960

MEDA — SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENDER, MICHAEL	1971
CHASTAIN, GARY K.	1972
FLUG, EUGENE R.	1967
HURLEY, CARL E.	1971
MEERS, GARY D.	1972
RILEY, JOHN N.	1972
SNYDER, VANCE B.	1960

METH — TEED

AUTHOR	DATE
CROWDER, GENE A.	1968
DAWSON, KENNETH E.	1965
DITLOW, GEORGE H.	1956
DUNFEE, EMERY S.	1964
FAHRLANDER, DANIEL D	1972
FRYE, BILL J.	1971
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
GHEEN, WILLIAM L.	1970
HARDER, JACOB D.	1970
HOLT, IVIN L.	1972
JACKMAN, DUANE A.	1961
JELDEN, DAVID L.	1960
KRUGER, JOHN M.	1971
KURTH, EDWIN L.	1955
LAPPIN, ALVIN R.	1958
LEASE, ALFRED A.	1964
LOW, FRED G.	1963
MC KEE, RONALD R.	1971
MILLS, EARL S.	1971
MITCHELL, JOHN	1954
NOVOSAD, JOHN P.	1971
OLIVER, WILMOT F.	1967
RAY, J. EDGAR	1944
SEXTON, WILLIAM E.	1965
THATCHER, GLENN M.	1970

MNIP — METH

AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ALLEN, JOHN C.	1969
AUER, HERBERT J.	1971
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BIEKERT, RUSSELL G.	1971
BOUTWELL JR, COLEN J	1971
CHASTAIN, GARY K.	1972
CUSHING, NELSON N.	1971
DOTY, CHARLES R.	1968
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HERR, JAMES F.	1970
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JOLLY, FRANK H.	1970
KRUGER, JOHN M.	1971
LARUE, JAMES P.	1968
MARTINEZ JR, PETE	1970
MARTINEZ, PETE	1970
MC EOWEN, ROBERT H.	1967
MEERS, GARY D.	1972
MEYER, JOHN M.	1969
NANNAY, ROBERT W.	1970
NORTON, ROBERT E.	1967
ORR, WILLIAM H.	1970
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

PHIL — ADMN

AUTHOR	DATE
BACKUS, KERBY D.	1968
BAILY, ATHOL R.	1949
DAVISON, HAROLD J.	1931
FENDLASON, DONALD W.	1969
HAMMOND, ROBERT G.	1956
HANSEN, EDITH H.	1972
HARTZON JR, WILEY G.	1972
KREPEL, WAYNE J.	1967
MAGISOS, JOEL H.	1968
MALIK, JOSEPH A.	1968
MASON, WILLIAM H.	1970
MC GIVNEY, JOSEPH H.	1967
MC KINNEY, FLOYD L.	1969
MC NEIL, JACKSON M.	1968
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
SHELTON, JOHN A.	1968
THORP, JOHN H.	1945
WEAGRAFF, PATRICK J.	1971
YOUNG, FRED O.	1971
ZULLINGER, JOHN	1966

PHIL— COUN

AUTHOR	DATE
CLEVELAND, JOHN M.	1961
HYDE, ELDON K.	1968
LOOSLE, DARRELL K.	1967

PHIL— HIED

AUTHOR	DATE
CLABAUGH, RICHARD D.	1971
CLECKLER, JAMES D.	1969
FENDLASON, DONALD W.	1969
HAMMER, GARLAND G.	1951
HYDE, ELDON K.	1968
MALIK, JOSEPH A.	1968
SHERMAN, DOUGLAS R.	1956
STEGMAN, GEORGE K.	1962

PHIL— I.A.

AUTHOR	DATE
BACKUS, KERBY D.	1968
BAIRD, RONALD J.	1960
BIEDLER, JOHN S.	1958
CALLAWAY, ROLAND L.	1953
CARTER, JOHN P.	1970
EALES, ROY G.	1948
HALL, JAMES R.	1970
HAWSE, JOHN E.	1964
HORNBLAKE, R. LEE	1939
HUXOL, ROBERT L.	1954
KACHEL, STANLEY	1967
MASON, WILLIAM H.	1970
MASSENGILL, JOHN P.	1952
MC CLELLAN, LARRY D.	1971
MC CLELLAN, LARRY D.	1971
MEYER, HARVEY K.	1951
NIELSEN, ARNOLD M.	1970
PATE JR, DOVE H.	1970
SVENDSEN, ETHAN A.	1961
TALKINGTON, JOE E.	1962
THOMAS, CHARLES L.	1964
THOMAS, JOSEPH K.	1957
THORP, JOHN H.	1945
TSUJI, THOMAS T.	1967
WHITESEL, JOHN A.	1940
WOCKENFUSS, WILLIAM	1960
WOODY JR, EARL T.	1963

PHIL— I.E.

AUTHOR	DATE
ANDERSON, LOWELL D.	1969
BAILY, ATHOL R.	1949
DAVISON, HAROLD J.	1931
HAMMER, GARLAND G.	1951
HAMMOND, ROBERT S.	1956
KARR, DONALD L.	1969
MASSENGILL, JOHN P.	1952
MC CRORIE, THOMAS R.	1952
MC KEE, RONALD R.	1971
MC KEE, RONALD R.	1971
MOELLER, CARL A.	1961
RALSTROM, STIG E.	1969
ROBINSON, WALTER J.	1950
ZULLINGER, JOHN	1966

PHIL— T.I.

AUTHOR	DATE
HAMMER, GARLAND G.	1951
KARR, DONALD L.	1969
SEARS JR, WILLIAM P.	1930

PHIL— TCED

AUTHOR	DATE
DAVIS, WARREN C.	1936
HANSEN, EDITH H.	1972
HIRSCHI, HARVEY C.	1969
HYDE, ELDON K.	1968
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
SLATTERY, RAYMOND A.	1969
WALLACE, DONALD F.	1972

PHIL— VOED

AUTHOR	DATE
CARR, EVA R.	1970
CLECKLER, JAMES D.	1969
DASGUPTA, DEBENDRA C	1932
DAVIS, WARREN C.	1936
DAVISON, HAROLD J.	1931
DYKEHOUSE, JAY	1950
FAHRLANDER, DANIEL C	1972
HANSEN, EDITH H.	1972
HARRISON JR, RUSSELL	1971
HIRSCHI, HARVEY C.	1969
HYDE, ELDON K.	1968
KELLER, LOUISE J.	1969
KINGSLEY, LEONARD D.	1972
KREPEL, WAYNE J.	1967
LAHREN, JAMES A.	1970
LOOSLE, DARRELL K.	1967
MAGISOS, JOEL H.	1968
MC CRORIE, THOMAS R.	1952
MC GIVNEY, JOSEPH H.	1967
MC NEIL, JACKSON M.	1968
MEDEIROS, EDWARD J.	1970
MOELLER, CARL A.	1961
MORGAN, JIMMY B.	1969
NEASHAM, ERNEST R.	1968
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
SCHREIBER, ERNEST	1967
SEARS JR, WILLIAM P.	1930
SHELTON, JOHN A.	1968
SHEPARD, JON M.	1968
SHERMAN, DOUGLAS R.	1956
SHULTZ, FRED A.	1971
SLATTERY, RAYMOND A.	1969
SPRECHER, ROBERT E.	1970
WEAGRAFF, PATRICK J.	1971
WILLIS, GEORGE E.	1972
YOUNG, FRED O.	1971

PRED – PRTR

AUTHOR	DATE
ATHANASIOU, ROBERT B	1969
AUCKER, JOHN R.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
DITTENHAFER, CLARENC	1972
FLEMING, JOSEPH W.	1937
GIACHINO, JOSEPH W.	1949
JELDEN, DAVID L.	1971
KAPES, JEROME T.	1971
KOUTNIK, PAUL G.	1968
MILLER, AARON J.	1966
PITTMAN, FRANK M.	1970
SANDMAN, CHARLES W.	1969
STONE, THOMAS C.	1969
STOUGHTON, ROBERT W.	1955
SULLIVAN, THOMAS W.	1967
VACEK, WILLIAM L.	1962
ZIMMER, THEODORE A.	1969

PRED – VOGI

AUTHOR	DATE
ANDERSON, EDWARD T.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
BORTZ, WALTER R.	1971
BOYDEN, LLOYD R.	1972
CHILSON, JOHN S.	1969
COHEN, JERRY M.	1969
COX, STEVEN G.	1968
DITTENHAFER, CLARENC	1972
ELLIOTT, EARL S.	1967
EVANCHO, MICHAEL	1947
FLEMING, JOSEPH W.	1937
FRYKLUND, VERNE C.	1933
GRIFFIN, JAMES F.	1970
HARRIS, VIRGINIA J.	1961
HAUGO, RICHARD R.	1969
JENKINS, FARRELL T.	1969
KAPES, JEROME T.	1971
KRANTZ, MATTHEW B.	1970
KRUBECK, FLOYD E.	1954
KUNTZ, ELMER L.	1968
LARSON, RAYMOND H.	1951
MICHIE, JACK	1968
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MILLER, CLARENCE M.	1968
MOORE, LELAND B.	1970
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QUICK, OTHO J.	1954
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SCHULTZ, IRWIN J.	1949
THORPE, CLAIBURNE B.	1968
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CRAWFORD, JOHN E.	1941
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CUONY, EDWARD R.	1963
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ERWIN, CLIFFORD H.	1963
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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
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Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purposes of the study were to ascertain (1) the relative importance of selected attributes of curriculum development in vocational and technical education in Ethiopia, (2) the extent of agreement in opinions among selected specialists in the United States, vocational-technical teachers and secondary school principals in Ethiopia regarding the relative importance of selected attributes, (3) the extent of agreement in opinion between the specialists and the participating groups of teachers and principals in ranking the attributes, and (4) to propose a procedure for developing relevant curricula in vocational and technical education in Ethiopia.

An Information Form containing 121 curriculum attributes, four open-ended questions, and blank spaces for personal data of the respondents was developed and mailed to the individuals; namely: 7 American specialists, 130 randomly selected Ethiopian teachers and 20 secondary school principals. Based on Ralph W. Tyler's rationale for curriculum development, the selected attributes were organized under 16 blocks relating to (1) Objectives, (2) Subject matter content, (3) Learning experiences, and (4) Evaluation with respect to vocational and technical education in Ethiopia. The 7 items under each of the blocks were ranked in order of importance by the participating individuals. Six specialists, 70 teachers and 17 principals completed and returned the forms. The responses of these groups and the combined group of teachers and principals were recorded and analyzed. Three types of statistical tests were performed to verify the 9 research hypotheses set forth in the study.

Based on these tests, the ranks assigned to the items by the specialists were found to be significant in 15 blocks; those assigned by the teachers, the principals and the combined group of teachers and principals were significant in all 16 blocks.

The degree of agreement among the specialists varied from 30 to 87 per cent; among the teachers, from 15 to 37 per cent; among the principals, from 20 to 70 per cent; and among the combined group of teachers and principals, from 47 to 64 per cent.

Significant associations between the rankings of the items by the specialists and the teachers were found in 4 of the 16 blocks, between the rankings by the specialists and the principals, in 12 of the cases; between the rankings by the specialists and the combined group of teachers and principals, in 9 of the cases; and between the rankings by the teachers and the principals, in 11 of the 16 blocks of items. No significant relationship between the rankings of the items by any two groups of respondents was found in 2 of the blocks.

From the evidence revealed by the analysis, it was concluded that curriculum development is too complex to be left to a single agency or occupational group. Therefore, it was recommended that the Ministry of Education should provide the leadership in involving teachers, principals, specialists, and selected and knowledgeable individuals from business and industry in developing vocational curricula. Further, a fourteen-steps procedure for developing relevant curricula in vocational and technical education in secondary schools of Ethiopia was recommended.

Order No. 72-10,568, 243 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Abitia, Freddie, _____
(Last name) (First name) (Middle name)

Exact Title THE DEVELOPMENT AND FIELD TESTING OF A SELF-INSTRUCTIONAL SYSTEM IN INDUSTRIAL DESIGN METHODOLOGY

Degree granted Ed.D., Date 1971 No. of pages in report 246

Granted by Washington State University (Name of institution) Pullman, Washington (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to design, develop, and field test a self-instructional system designed to help students acquire basic knowledges in industrial design.

More specifically, the objectives of this study were to:

1. Design the experimental self-instructional system in industrial design.
2. Develop strategies for evaluating the effectiveness of the experimental system.
3. Develop and implement the experimental system.
4. Determine the effectiveness with which students of different abilities are able to achieve the stated design objectives via the experimental self-instructional system. The effectiveness was basically determined by the time required for each student to complete the system and by a comparison of the pretest-posttest gain scores achieved by a control group unexposed to the system and an experimental group exposed to the system.
5. Determine the level of student independence in the achievement of stated objectives, as measured by the average amount of instructor time required by students of different abilities.
6. Suggest revisions based on field test results.

The overall design of this study was developed in the evaluative experiment mode, with additional variations to overcome the effects of extraneous contamination. Thus, control and experimental groups were utilized to determine to what extent the subject's performance could be directly attributed to the system per se, as opposed to showing the superiority of one instructional method over another.

The sample used for the study consisted of 30 college industrial education majors randomly assigned to a control or an experimental group. Students were classified within their respective groups as either high or average ability subjects in accordance with predetermined criteria.

The systems components consisted of a filmstrip-sound projector, six 16 mm color filmstrips housed in filmstrip-sound cartridges, a student guide comprised of diagnostic quizzes, branching directions, and programmed film reviews, an instructor's guide, and an answer booklet.

Once the system had been introduced by the instructor, the system directed the students through a series of 16 mm loop filmstrips designed to present knowledge in industrial design. After viewing each film, students were directed to take a diagnostic quiz to determine the extent of knowledge gained and to determine subsequent routing through the system.

Analysis of data indicated that students in both the control and experimental groups experienced increased levels of learning which, although different in magnitude, were statistically significant above the 5 per cent level using Fisher's *t* test. More specifically, the control and experimental groups were able to gain 55 and 86.5 per cent, respectively, of the knowledge to be gained after pretesting.

An examination of the mean number of instructor assists for the experimental group reveals that the greatest number of assists were given to members of the average ability group. However, the .28 mean number of assists for the entire experimental group suggests that the system succeeded in achieving some degree of automation.

Once the students had become familiar with the mode of instruction they required less than 9 seconds of instructor assistance per pupil, per lesson. Slightly over 2 minutes of "instructor time" were required to complete the entire system.

A student questionnaire utilized to appraise the system clearly points out that students felt that the system was of value to them and the mode of instruction and related materials were combined into a meaningful learning experience.

Order No. 72-7628, 246 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Acker, James, David
(Last name) (First name) (Middle name)

Exact Title THE CONSUMER EDUCATION FUNCTION FOR INDUSTRIAL ARTS EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 147

Granted by North Carolina State University Raleigh, North Carolina
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The need for consumer education is made critical by the continual change in and the diversity of consumer products which offer numerous alternatives for the consumer. As Americans depend chiefly on consumer goods to satisfy their needs and wants, problems in selecting, purchasing, using, maintaining, and evaluating the various goods are common. Consumer education is seen as aiding in the solution of such problems.

The primary purpose of this dissertation is to clarify the nature of the consumer function of industrial arts education by identifying the origins involved, concepts, purposes, and principles. This clarification serves a secondary purpose: to guide in selecting subject matter for consumer studies in industrial arts. Data concerning the problems of the consumer are presented for applicability in subject matter selection.

The study involves a review of pertinent literature for common information to support a curriculum proposal for consumer education subject matter in industrial arts. An essential part of the investigation includes analyses and interpretation of the literature to establish consumer education objectives for supporting such a proposal.

Investigation reveals consumer education to be an appropriate part of general education and that industrial arts can provide a unique contribution to this. The contributions to personal-economic efficiency which can be accomplished through consumer studies in industrial arts include: economic planning, standards for expenditures, information about consumer goods, and an understanding of guidelines for maintenance, use, and evaluation of the products purchased. These contributions are effected by study and work with materials, processes, and products in industrial arts.

It is recommended that there be coordinated efforts among disciplines within the school for developing more effective programs in consumer education. Industrial arts alone cannot provide the lot of consumer education. The need for continual evaluation of consumer education programs and materials is recognized. Recommendations are made for implementation of consumer education subject matter.

Order No. 72-3546, 147 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Adams (Last name), Maynard (First name), Francis (Middle name)

Exact Title AN INVESTIGATION INTO THE RELEVANCE OF THE CURRICULUM OF THE FOUR-YEAR INDUSTRIAL TECHNOLOGY PROGRAM AT WESTERN CAROLINA UNIVERSITY TO THE NEEDS OF ITS GRADUATES

Degree granted Ed.D., Date 1971 No. of pages in report 180

Granted by North Carolina State University (Name of institution), Raleigh, North Carolina (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of the study was to investigate the relevance of the curriculum of the industrial technology program at Western Carolina University, Cullowhee, North Carolina, to the needs of its graduates. This was accomplished by (1) comparison of the time allotted to the curriculum by the Western Carolina University program and other institutions with similar programs, and (2) determination of the relevance of the technical curriculum of the Western Carolina University program.

A review of related literature revealed only one study that considered time apportionment of industrial technology programs. The instructional areas were categorized, and one-hundred and twenty-nine industrial respondents in California indicated the percentage of time that should be devoted to each. The same categories were used for calculation of the percentage of quarter hours allotted to the areas by the program at Western Carolina University. The comparisons revealed that the categories of general education and technical subjects were emphasized more, and that the communications skills were emphasized less in the Western Carolina University program than by the California State Colleges study. Since the comparisons indicated differences of less than eight percent, it was concluded that the apportionment at Western Carolina University was appropriate. The California study did not total one-hundred percent because of insufficient ratings by the respondents; therefore, the comparisons were useful only as generalizations in considering the relevance of the categorized instructional areas to the needs of the graduates.

Data concerning the relevance of the technical curriculum was obtained from information forms completed by thirty-five industrial technology graduates and thirty-five industrial personnel employed as industrial technologists. Based on how often the respondents used the knowledges and skills of each instructional area in their industrial positions, and their opinions of each item's importance to its respective course, the areas and items were classified as *relevant* to the program when (1) the *area* was rated by seventy percent or more of the respondents as *occasionally* or *regularly* applied on the job or (2) seventy percent or more rated the *item* as, should be *emphasized* or *taught in depth* in the curriculum.

The laboratory areas of drafting-sketching, electricity-electronics, metal machining, welding and cutting, and woodworking were classified as relevant; while the areas of plastics, sheet metals, photography, offset printing, foundry, and forging were not. The classroom areas of industrial safety, plant development, shop maintenance, modern industry, and power and transportation were all found to be relevant to the program. The related technical areas of industrial management, industrial psychology, personnel management, motion and time study, physics, algebra, data processing, statistics, chemistry, finite mathematics, and economics were also found to be relevant. The elective areas of quality control, labor management relations, public speaking, technical writing, operations research, machine design, labor law, audio-visual methods, accounting, business law, personnel testing, and salesmanship were classified as relevant; while the remaining areas of applied fluids, marketing, internal combustion engines, marketing management, differential equations, marketing research, merchandising, advertising, letterpress printing, wholesaling, retailing, and gravure printing were not.

Only twenty-six out of the possible four-hundred and twenty-nine instructional items received ratings of *should be omitted* which resulted in their classification as *not* relevant to the curriculum; *i.e.*, laboratory, classroom, and related areas. The teaching of historical development in eleven areas represented forty-three percent of them.

It was recommended that the instructional areas and items classified as *relevant* be continued in their present manner, and those found not to be relevant be examined by the industrial technology faculty of Western Carolina University for possible modifications or deletion.

Order No. 72-11,984, 180 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Adelman, Frank, Walter
(Last name) (First name) (Middle name)

Exact Title A COMPARISON OF THE ARKANSAS VOCATIONAL AND TECHNICAL TEACHER EDUCATION PROGRAM WITH A JURY SELECTED MODEL

Degree granted Ed.D., Date 1972 No. of pages in report 148

Granted by University of Arkansas Fayetteville, Arkansas
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Problem

The purpose of this study was to develop a model teacher education program for vocational education. The program consisted of a model undergraduate curriculum and a model graduate curriculum. In addition, the study was designed to compare the present Arkansas program of teacher education with the model for the purpose of making recommendations for improvement.

Procedure

An opinionaire was developed by using a study of present course offerings in vocational and technical teacher preparation institutions in states having a comprehensive vocational and technical teacher education program. Opinions of a jury of teacher educators, state program directors, and executive directors of state advisory councils were used to select the model curricula. Only the elements that received fifty percent or greater positive responses were included in the model curricula.

A study was made of the status of vocational and technical teacher education by occupational service area. Included in this study were: data on enrollments and placements of vocational teacher preparation programs, present teacher certification requirements, manpower expansion, predicted teacher positions, and predicted teacher education program enrollments.

A comparison was made between the model and the present program of offerings of those Arkansas institutions of higher education offering programs of vocational teacher education.

Conclusions

According to the findings of this study, the following conclusions were formulated.

1. There is a basic group of courses which appear with such regularity in each of the teaching areas as to make a core of primary courses for all vocational teachers.
2. There are certain courses which identify in subject matter specialty with specific teaching areas and are best taught as part of the curriculum for that specialty.
3. There is sufficient divergence between the model curriculum and the present teacher education program of curricular offerings to warrant recommendations for improvement in all areas of vocational teacher education.
4. Present certification requirements as prescribed by the current state plan are poorly designed to develop expertise in teachers in view of the developed model.
5. Certification requirements for occupational service areas vary considerably between areas as well as from standards implied by jury response.

Recommendations

On the basis of the data collected and reported in this study, the following recommendations appear to be feasable:

1. The model curricula developed should be used as a basis for improvement of vocational teacher education. An effective program can best be accomplished with vocational teacher preparation in all occupational areas as a function of vocational education rather than general education at both the graduate and undergraduate levels.
2. There is a need to develop a well-defined cooperatively developed agreement between the state agencies and institutions of education providing teacher education.
3. Teacher education in all occupational areas should include programs of technology and skill development as well as professional education. Provisions should be made for the acquiring of practical experience.
4. The curriculum for the preparation of teachers should include provisions for both practice teaching and internship teaching.
5. New programs should be initiated to develop teachers with the practical experience and techniques necessary to teach persons having special needs—including those with academic, socio-economic or other handicaps—which would prevent their success in regular programs of vocational education. Teacher certification regulations for these new teachers should be developed.
6. Teacher certification qualifications should be reviewed by a joint effort of teacher educators, state department personnel, and employers of teachers of vocational subjects, with the assistance and advice of advisory committees chosen for their expertise in the occupational area under review.

Order No. 72-10,183, 148 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Alaki (Last name), Madani (First name), Abdulkader (Middle name)

Exact Title INDUSTRIAL-VOCATIONAL EDUCATION IN SAUDI ARABIA: "PROBLEMS AND PROSPECTS"

Degree granted Ph.D., Date 1972 No. of pages in report 350

Granted by The University of Arizona (Name of institution) Tucson, Arizona (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to reveal the major problems of industrial-vocational education in Saudi Arabia, and the contributions this educational system makes to the labor market of the country, especially its contributions of technicians and skilled workers. Industrial-vocational education represents only one of several government manpower development programs. This educational system passed through a series of several changes for the purpose of upgrading its quality and increasing its enrollment. Though certain developments such as the "open system" of industrial-vocational education seem a proper solution to the problem of the unattractiveness of industrial-vocational education other problems still remain to be solved in this system. Perhaps the most critical problems that exist are those related to the size of enrollment, the quality of personnel, and the slow response of the system in meeting the needs of the private sector.

Low enrollments are attributed, however, to educational and social problems. Saudi young people prefer academic education over vocational education. Academic education appears the natural choice for those students who desire to pursue their educational ambitions to the highest levels. For academic education assures good government positions for graduates seeking the security and status of government jobs.

Socially, vocational education suggests the concepts of dirty hands and long hours of work, besides the insecurity of such jobs. Social values and the culture of the society assigns vocational education a low status and to the students, industrial-vocational education implies less prestigious jobs.

The quality of teachers and administrators represents another challenge to the advancement and progress of industrial-vocational education. In fact, most of the teachers and administrators of the existing system are termed unqualified personnel by the leaders of this system. The Higher Technical Institute and the Higher Industrial Institute were proposed to provide the qualified theoretical and practical teachers which this system needs. However, these institutes are still in the planning stages and their products are expected only shortly before the end of the present decade.

One of the oth educational problems that hamper the advancement of industrial-vocational education in the country is that the school buildings currently in use are not suited to the type of education being offered in them.

The dependence on foreign textbooks and references represents another educational problem that remains unsolved by educational leaders. While lectures and shop instructions are given in the Arabic language, textbooks and study references are written in foreign languages that cause fear and frustration among students.

Most graduates of the industrial-vocational schools of the Kingdom join the public sector, leaving the private sector to depend almost entirely on imported labor. (Analysis of techniques in the private sector shows that only a few of the graduating students join private industry, while most of them join the public sector in search of security and prestige.)

Analysis of the number of technicians required for the country during the Development Plan for 1970-75 shows that industrial schools provided only .03 per cent of the estimated number of technicians needed by the private sector.

Further analysis of the estimated number of technicians required during the period from 1975-1980 shows that Saudi Arabia will experience a shortage of 3,640 technicians who must either be supplied by industrial-vocational schools or be hired as imported labor.

The study concludes with recommendations the author believes would improve the present status of industrial-vocational education in Saudi Arabia.

Order No. 72-15,605, 350 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Aldrich, III, Daniel, Gaskill
(Last name) (First name) (Middle name)

Exact Title AN ANALYSIS OF VOCATIONAL PROGRAM COSTS

Degree granted Ph.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles Los Angeles, California
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To ascertain accurate vocational program costs and their estimates required development and identification of a program accounting structure; procedures for prorating indirect cost; a unit for cost comparison; and a cost-estimation formula.

Source of data and method of study:

The resulting accounting structure identified four distinct levels: District, General Service Grouping, Service Grouping, and Program Grouping. Program unit costs, for purposes of cost comparisons, were determined by using the Annual Student Contact Hour as the base unit of measurement. The above procedures were applied in gathering 1969-70 data from a sample of three high school districts and one community college district in each of seven states. The determined program unit costs were used to test the effectiveness of the program cost-estimation formula.

Findings and Conclusions:

1. Teachers' salaries comprised the largest percentage of the total cost of a vocational service. That percentage was followed by the indirect cost percentages for General Support and for Plant Operation and Maintenance.
2. Community college districts spent larger percentages of total vocational cost for instructional equipement replacement, rental, and maintenance than did high school districts.
3. All vocational program and industrial arts service current unit costs were higher than current unit costs of other instructional programs.
4. Community college mean other instructional program and mean vocational unit costs were approximately twice the high school mean other instructional program and mean vocational unit costs.
5. Deviations about the program mean costs were large.
6. The cost-estimation formula proved generally ineffective.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Allen (Last name), Fleet (First name), Devotion (Middle name)

Exact Title ADVISORY COMMITTEE ORGANIZATION, ROLE, AND UTILIZATION

Degree granted Ed.D., Date 1971 No. of pages in report 73

Granted by North Carolina State University (Name of institution) Raleigh, North Carolina (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Data were collected from 44 Vocational Education Directors in North Carolina Secondary Schools and/or city districts on their presentation of the organization, role, and utilization of Vocational Advisory Committees in programming.

The objectives of this study were to determine the North Carolina Secondary School Vocational Directors': (1) use of Vocational Advisory Committees in programming; (2) perception of the 67 selected programming roles general Vocational Advisory Committees should or should not become involved; (3) perception of the organizational structure a Vocational Advisory Committee needs for programming; and (4) agreement with a conceptual model, drawn from relevant literature, among local directors of the roles and organizational structure a Vocational Advisory Committee needs for programming.

An instrument was developed using three major sections: (1) five demographic data items of respondents; (2) sixty-seven selected programming roles; and (3) fifteen organizational structure items. This instrument was mailed to all 47 Vocational Educational Directors in North Carolina Secondary Schools.

Frequency distributions were developed for each of the personal characteristic variables. Percentages were computed for the 67 selected programming roles and the 15 organizational structure items to determine agreement with the conceptual model.

The data show that 80 per cent of the Vocational Education Directors do not use Vocational Advisory Committees in programming.

North Carolina Vocational Education Directors' consensus with the conceptual model on the 67 selected programming roles were found to be as follows: (1) high consensus on 63 per cent; (2) medium consensus on 30 per cent; and (3) low consensus on 7 per cent of the programming roles.

Consensus of the North Carolina Vocational Education Directors with the conceptual model on the 15 organizational structure items were found to be as follows: (1) high consensus on 20 per cent; (2) medium consensus on 20 per cent; and (3) low consensus on 60 per cent of the items.

The 44 North Carolina Vocational Education Directors, when compared with the 5 independent variables showed the following: (1) high consensus on 61 per cent; (2) medium consensus on 39 per cent; and (3) none with consensus on the 67 programming roles when compared with the conceptual model.

Order No. 72-10,094, 73 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Altus (Last name), David (First name), Morris (Middle name)

Exact Title SIMULATION AS A FEEDBACK MECHANISM IN TRAINING ENGINEERING DRAFTSMEN

Degree granted Ed.D., Date 1972 No. of pages in report 88

Granted by New Mexico State University (Name of institution) University Park, New Mexico (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose and Hypotheses of the Study

The purpose of this study was to (1) develop simulation feedback materials for mechanical and electronics drafting classes for locating critical components on technical drawings, and (2) field test these materials under controlled experimental conditions.

Seven research hypotheses were tested with regard to critical component placement in three mechanical drafting and detailing classes. These hypotheses were:

1. There will be a significant difference between treatment groups (factor B) with regard to overall placement of critical components on technical drawings.
2. There will be a significant difference between classes (factor A) with regard to overall placement of critical components on technical drawings.
3. There will be a significant difference between trials (factor C) with regard to overall placement of critical components on technical drawings.
4. There will be a significant interaction between factors A and B.
5. There will be a significant interaction between factors A and C.
6. There will be a significant interaction between factors B and C.
7. There will be a significant interaction between factors A, B and C.

These same seven hypotheses were also tested with regard to the general technical excellence of drawings submitted by the members of the three mechanical drafting and detailing classes.

Three research hypotheses were tested with regard to the placement of critical components on technical drawings in the context of a single class in electronics drafting and design. These three hypotheses were:

1. There will be a significant difference between treatment groups (factor A) with regard to overall placement of critical components on technical drawings.
2. There will be a significant difference between trials (factor B) with regard to overall placement of critical components on technical drawings.
3. There will be a significant interaction between factors A and B.

These same three hypotheses were also tested with regard to the general technical excellence of drawings submitted by the members of this class.

Procedures

Two measures were taken on each completed drawing: (1) a measure of the critical components correctly positioned, and (2) a measure of general technical excellence.

Scores obtained on each of these two measures were subjected to separate analyses of variance in the three mechanical drafting and detailing classes and in the electronics drafting and design class.

Duncan's New Multiple Range Test was used as an after-F statistic on those means shown to be significant as a result of the analysis of variance.

A nonparametric test (sign test) was applied to the sign of differences between treatment groups taken over all classes and all trials.

Findings

The hypotheses concerning trials as a main effect were significant at the 0.05 probability level with regard to both mechanical drafting and detailing as well as electronics drafting and design class. The sign test indicated significant differences favoring the experimental groups.

Order No. 72-22,776, 88 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Andre (Last name), Nevin (First name), E. (Middle name)

Exact Title POST HIGH SCHOOL EDUCATIONAL EXPERIENCES AND OCCUPATIONAL STATUS OF GENERAL-ACADEMIC AND VOCATIONAL-TECHNICAL HIGH SCHOOL GRADUATES

Degree granted Ed.D., Date 1964 No. of pages in report 310

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To compare post high school educational experiences and occupational status of general-academic and trade and technical high school graduates who had not attended college and had been out of school five, ten, and fifteen years

Source of data and method of study:

Data for the study were obtained from the high school records of graduates at the Board of Education, St. Louis, Missouri, and from information forms obtained from 301 white general-academic graduates of Beaumont High School and 451 white vocational-technical graduates of Hadley and O'Fallon Technical High Schools. Additional information was obtained through a rating form submitted by the employers of 137 general-academic and 231 vocational-technical graduates.

Findings and Conclusions:

1. Many graduates discove short-comings in their high school education, or conclude that they need additional training for work, and fulfill the need by enrolling in post high school educational programs.
2. The trend in employment of vocational-technical graduates is towards technical and skilled occupations, wheras the trend for general-academic graduates is towards professional, sales, semiskilled, and skilled occupations.
3. As the length of time since graduation increases, those who are in the upper intelligence and scholastic levels will be the recipients of higher wages as compared to those in lower levels.
4. Vocational-technical graduates who work in the trades for which they are trained will usually earn a larger wage than graduates employed in occupations unrelated to their training.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Arnold (Last name), Joseph (First name), Paul (Middle name)

Exact Title TECHNICAL EDUCATION CURRICULAR RECOMMENDATIONS BY MANAGEMENT REPRESENTATIVES OF MANUFACURING ESTABLISHMENTS IN ILLINOIS

Degree granted Ed.D., Date 1965 No. of pages in report

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

The problem studied is whether or not a group of technically qualified management personnel of maufacturing establishments which employ technicians will exhibit more general views toward post high school technical curricula than will technicians themselves.

Source of data and method of study·

Statistical tests were used to assess the relationships between generality of curricular selections and the variables (1) age, (2) educational attainment, (3) company size, and(4) length of time with present employer.

The sample of manufacturing establishments was selected from those plants in Illinois with 200 or morre employees. A total of 130 respondents was utilized from 40 plants; 1 technician and 1, 2, or 3 management respondents from each of the same plants. Each management respondent of a given company represented a differnet level of authority in relation to the technician job to which he responded.

Findings and Conclusions:

1. The occupational level as structured in this dissertation is not important as a basis for nomination of members for educational advisory and curriculum committees.

2. Concluded that the view of any one group tested in this study are not measurably different on the criterion of generality from the views of the other groups.

3. Committee nominations, either from among technician's or from among management personnel, would not narrow the curricular view of the committee. If one assumes that certain management personnel are in key postions to identify educational needs of technicians, the technician himself should be considered as occupying a similar position.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Aronson (Last name), Norma (First name), _____ (Middle name)

Exact Title SKILL CHANGES; THEIR EFFECT ON LITHOGRAPHERS AND UNION

Degree granted Ph.D., Date 1967 No. of pages in report _____

Granted by New School for Social Research (Name of institution) New York, New York (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The impact of automation and other technological innovations on the labor force, its size, and its stratification in the future.

Source of data and method of study

Restricts investigation to a specific industry, lithography, and to a specific stratum in the industry, the skilled. Examines the impact which technological changes have on the occupational status of the skilled and on the union power related to it.

Findings and Conclusions

1. That in this expanding craft industry the occupational stutus of the skilled is changing, and that depending on the job, it may mean upward mobility for its holder (closer to the rank of the white collar technician) or downward mobility (to the rank of the semi-skilled).

2. By new processes the skills in different branches of the printing industry have become interchangeable which traditionally they were not.

3. Part of the industry has emigrated to non-traditionsl, national markets; in quite a number of companies that manufacture different products, printing is done now on their own premises.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ashley (Last name), Jackson (First name), Wayne (Middle name)

Exact Title THE GENERAL APTITUDE TEST BATTERY AS A PREDICTOR OF SUCCESS IN VOCATIONAL COURSES IN SELECTED KENTUCKY SCHOOLS

Degree granted Ed.D., Date 1971 No. of pages in report 176

Granted by University of Kentucky (Name of institution), Lexington, Kentucky (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The study was concerned with investigating the potential of the General Aptitude Test Battery for use in the identification, selection and counseling students planning to enter vocational education courses in high school and in the area school or extension centers. It was based on the need to better meet the vocational development and career planning needs of youth in secondary school by providing them with information about probable chances of success in vocational education courses.

Design of the Study

The design of the study was a correlational analysis using stepwise multiple regression to determine the effectiveness of the aptitude scores as predictors of the criterion and the best combination of aptitude scores which yield the maximum correlation obtainable. Coefficients of multiple correlation and regression equations were used to determine the contribution of each aptitude score to the prediction of success in each course. Courses and areas best and least predicted and the aptitudes which were the best predictors were determined. Variations in levels of relationship and in the best predictors for each course were studied from the correlations of the nine aptitudes with the criterion to determine the need for local validity data.

The criterion used as a measure of success was the single subject grade at the end of the eleventh grade. The nine aptitude scores of students tested at the tenth grade level were used as the independent variables and the end of the year course grades as the dependent variables. An effective predictor was defined as one whose regression coefficient (b) was significant at the .05 level of confidence as determined by the "t" test. The accuracy of the regression equation as a prediction instrument was studied by the coefficient of multiple correlation, R. Significance of the Multiple R was evaluated by the F variance ratio.

Definition of the Sample

Schools selected for the study were located in an area surrounding the Bowling Green Area Vocational School. Course grades were collected for approximately 1,200 students.

Analysis of the data was completed for six courses being taught in the area school or extension center and nine courses in the high school. Courses studied include, Office Machines, General Business, Typing, Shorthand, Accounting, Bookkeeping, Auto Mechanics, Building Trades, Electricity, Agriculture, Horticulture, and Home Economics.

Findings

1. Vocational course grades were predicted successfully in most instances from the aptitudes of the GATB in courses taught in the area school or extension center and those taught in the secondary school.
2. Considerable variation existed in the best predictors for the different courses and for the same courses in different schools. This suggests a need for each school to establish its own local validity data.
3. General Ability, Verbal and Numerical were the most frequently identified significant predictors. Findings from the study indicated that the abilities needed to succeed in the more academic areas are also the most frequent predictors of vocational training success.
4. The perceptual and manipulative abilities were identified in several instances in the commercial area and suggest the measures of differential abilities are needed in counseling with students about probable chances of success in vocational training.
5. Although General Ability was one of the most frequent predictors it was significant in only five of the fifteen courses analyzed. This supports conclusions from other studies that undue reliance on the IQ or ability measure if and when selecting students to enter vocational courses may be unfair to many students.

Order No. 72-21,441, 176 pages.

SOURCE GUIDE FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bailey, (Last name) Donald (First name), Allen (Middle name)

Exact Title A FOLLOW-UP STUDY OF THE VOCATIONAL-INDUSTRAIL TEACHER CERTIFICATION SUMMER WORKSHOP PROGRAMS (1965-1969) AT THE UNIVERSITY OF MARYLAND

Degree granted Ed.D., Date 1970 No. of pages in report 238

Granted by University of Maryland, (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was a follow-up study to evaluate the Vocational-Industrial Teacher Certification Summer Workshop Programs at the University of Maryland.

The enactment of the Vocational Education Act of 1963, caused an increase in the demand for vocational-industrial teachers in the State of Maryland, due to the expansion of existing vocational programs and the construction of new area vocational high schools.

The University of Maryland, the only vocational-industrial teacher training institution in the State, in an endeavor to cope with the situation, developed a summer workshop program to train vocational-industrial teachers. Since the inception in 1965 of the vocational-industrial summer workshop through 1969, five classes have completed and entered the field of teaching.

Specifically, this study was designed to investigate four topical questions.

1. Have the different summer workshop programs provided the necessary pedagogical preparation for new vocational-industrial teachers?
2. What has been the retention and dropout rate of vocational-industrial teachers that completed the summer workshop programs?
3. What has been the professional growth of the participants that completed the summer workshop programs?
4. Did the socializing aspect contribute to the overall objectives of the programs?

The problem of this study was to follow-up the participants of the five (1965-1969) Vocational-Industrial Teacher Certification Summer Workshops and to obtain and analyze their evaluative statements on this program.

The problem was categorized into four areas as follows: pedagogical preparation, teacher retention and dropout, professional growth, and the socializing aspect. The conclusions were based on an analysis of the data collected in the course of this study.

1. The following conclusions were drawn concerning the pedagogical preparation of vocational-industrial teachers in the summer workshop programs.

   a. The data indicated that the participants of the five vocational-industrial summer workshop programs evaluated the specific courses consistently throughout the different workshops. The courses were ranked, for providing the necessary pedagogical preparation, as follows: first, Methods of Teaching; second, Occupational Analysis and Course Construction; third, Laboratory Organization and Management; and fourth, Workshop in Vocational Education.

2. The following conclusions were drawn concerning the retention and dropout of teachers completing the five vocational-industrial summer workshop programs.

   a. The data indicated that the dropout rate among the automotive and building occupations was the highest, 14 teachers. These two occupations accounted for 26 per cent of the total enrollment in the five summer workshops. However, the dropout rate for these two occupations was 52 per cent of the total dropout.

   The occupations that had the best rate of retention were the health occupations, plumbing-heating and refrigeration-air conditioning, and miscellaneous trades. These occupations accounted for 28 per cent of the total enrollment in the summer workshop pro-

3. The following conclusions were drawn concerning the professional growth of the teachers completing the five vocational-industrial summer workshop programs.

   a. The data indicated that the professional growth of the teachers that participated in the summer workshop programs had been in the areas of course work beyond the summer workshop and educational affiliations. The mean semester hours of course work completed, beyond the summer workshop, by the teachers were as follows: 1969 workshop, 4.548 semester hours; 1968 workshop, 11.093 semester hours; 1967 workshop, 13.312 semester hours; 1966 workshop, 17.921 semester hours; and 1965 workshop, 21.000 semester hours.

   The data indicated that there was no difference between educational background and subsequent course work. There was no difference between certification held and grade point average earned in the workshop. There was no difference between age and certifications held. There was no difference between degrees held and grade point average in the summer workshop.

   There was no relationship between age, semester hours completed beyond the summer workshop, and grade point average earned in the summer workshops.

4. The following conclusions were drawn concerning the social aspect of the five vocational-industrial summer workshop programs.

   a. The data indicated that the teachers that resided on campus tended to socialize more with other members of the workshop than those teachers that commuted to campus. The data also indicated that the teachers that resided on campus and socialized maintained more contacts with fellow teachers after completion of the workshops.

Order No. 71-13,195, 238 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bailey (Last name), Larry (First name), J. (Middle name)

Exact Title AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS

Degree granted Ed.D., Date 1968 No. of pages in report

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To determine the applicability of Super's vocational development theory for explaining the vocational behavior of selected young practical nursing students during the exploration vocational life stage.

Source of data and method of study:

A sample of 485 students was drawn from the population of enrolled students utilized for the paren stude. Variables to be investigated were drawn from instruments previously administered to all enrolled students. A descriptive design was utilized in an attempt to identify the variables related to women's vocational behavior.

Findings and Conclusions:

1) The high propor tion of students having had health related occupatioanl experiences prior to enrolling to PN training indicated that most students were successful in translating their work interests and values into occupational roles.

2) Exploration in the home was apparent as students sought parental advice concerning their occupational interests.

3) As students range of interpersonal relations widened, individuals in the health occupations assumed more influence as role models.

4) The exploration vocational life stage was also characterized by reality teasting.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Barlow (Last name), Gene (First name), A. (Middle name)

Exact Title AN ANALYSIS OF FACTORS RELATING TO FEDERAL FUNDING IN FLORIDA SCHOOL DISTRICTS

Degree granted Ed.D., Date 1971 No. of pages in report 87

Granted by The University of Florida (Name of institution) Gainesville, Florida (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem of this study was to examine the relationship of selected variables to levels of federal funding of school programs in Florida school districts. Four measures of federal funding were selected. These represented the four major thrusts in federal participation in state and local school finance, and were as follows: (1) Elementary and Secondary Education Act (ESEA), (2) National Defense Education Act (NDEA), (3) Vocational Education Act basic grants (VOC), and (4) Public Laws 815 and 874 combined (IMPACT).

The two primary techniques of analysis were stepwise multiple regression analysis and canonical correlation analysis. In the former, predictive models were established for each of the dependent variables in terms of a sub-set of the selected independent variables, while in the latter the set of dependent variables were analyzed in terms of the set of independent variables.

In regard to the regression analysis, the major findings were as follows:

1. Approximately 48 percent of the variance in ESEA funds could be accounted for by the proportion of low income families, ratio of superintendent's salary to beginning teachers' salaries, ratio of administrative staff to instructional staff, ratio of high school to elementary pupils, administrative cost total expenditures of the school district, and proportion of population under 18.

2. Approximately 54 percent of the variance in NDEA funds could be accounted for by total expenditures of the school district, beginning teachers' salaries, percent of population change in the past decade, and the proportion of non-white registered voters.

3. Approximately 45 percent of the variance in VOC funds could be accounted for by the buying income of families, total expenditures of the school district, ratio of administrative cost to total cost, median income of families, and proportion of high income families.

4. Approximately 54 percent of the variance in IMPACT funds could be accounted for by proportion of the population 65 and over, percent of non-white registered voters, percent of democratic voters in the 1960 presidential election and ratio of administrative cost to total cost.

In regard to the canonical correlation analysis, three canonical functions were derived having canonical roots of 0.69, 0.57, and 0.52 respectively. From the correlations of the original variables with the canonical functions, it was judged that the first two roots were similar in nature and revealed a general prosperity dimension to which the three federal funding measures, ESEA, NDEA, and VOC, were negatively related. IMPACT aid was positively related to this dimension.

Order No. 72-21,043, 87 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Barringer, Dean, ____
(Last name) (First name) (Middle name)

Exact Title A COMPARATIVE COST ANALYSIS OF PRE-BACCALUAREATE, OCCUPATIONAL, GENERAL STUDIES, AND ADULT-CONTINUING PROGRAMS IN 1969-1970 OF ILLINOIS PUBLIC JUNIOR COLLEGES

Degree granted Ph.D., Date 1971 No. of pages in report 201

Granted by Southern Illinois University Carbondale, Illinois
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem studied was the difference between the cost of pre-baccalaureate, occupational, general studies, and adult-continuing programs of Illinois Public Junior Colleges. Additional objectives were: (1) to determine the relationship of sources of revenues and expenditures for each institution, (2) to determine amount of tax levy, rate of collection, and deficit financing employed by each institution, and (3) to determine the amount of tuition and activity fees charged by each institution.

All Class I Junior Colleges in Illinois were involved in this study through use of 1969-70 unit cost data from the Junior College Board. A supplementary questionnaire was used to obtain data not contained in the States' unit cost study. A letter and supplementary questionnaire were sent to all deans of business or business managers of the junior colleges involved in the study.

Findings and Conclusions

There was a lack of uniformity in cost data, particularly among disciplines that appeared in more than one program. The conclusion, arising from this finding is that junior colleges do not interpret cost data directives uniformly.

Occupational programs cost the most per credit hour. This high cost was because of large expenditures for equipment reported in the category of other departmental costs. On a statewide basis 20.2 percent of the total student credit hours generated were in occupational programs. The conclusion is that with the exception of City Colleges of Chicago, junior colleges are meeting the requirement of the law in the occupational program.

Twelve junior colleges are experiencing financial problems. This study shows that revenue exceeded the expenditures in twenty of twenty-eight colleges in the educational fund, in nineteen of twenty-eight in building fund, and seven of twelve in the auxiliary enterprises fund. The conclusion is that most junior colleges are sound financially.

The average state share of revenue for junior colleges is 29 percent. Local taxes on a statewide basis were contributing 41 percent of the total revenue. The conclusion is that local taxes are contributing a higher percentage of total revenue than projected in the *Master Plan Phase II for Higher Education* and that the state share of total revenue is lower than projected in the *Master Plan Phase II for Higher Education.*

Twenty-nine of thirty-four junior colleges were charging tuition. The questionnaire showed a percentage of total revenue derived from tuition to be 15 percent. The conclusion is that tuition accounts for a substantial share of the percentage of revenue. The twenty-eight colleges in the study showed federal funds contributed 2 percent of the total revenue. The conclusion is that federal funds were not a chief source of revenue for junior colleges.

Recommendations

The following are the recommendations which were made as a result of this study. These recommendations cover the analysis of cost data, and suggest ways to obtain additional revenue and increase the flexibility of financing junior colleges.

The unit cost manual should provide more explicit definitions of programs, disciplines, and costs. This change could improve the consistency of the data reported. The Department of Labor working cooperatively with the Division of Vocational and Technical Education should establish manpower priorities based on the employment needs of the state. The Illinois Junior College Board should examine more closely the disciplines with high costs to ascertain the appropriate level of instruction for higher education.

Twelve of the junior colleges were having some financial problems in their operating funds. Legislation for the enactment of a minimum foundation level or equalization is now essential for public junior colleges with low equalized assessed valuations based upon the average equalized assessed valuation shown in Appendix A. The State of Illinois should adopt a minimum foundation level for junior colleges. In addition, the legislature should increase the semester hours apportionment from $15.50 to $17.50. This would enable the state share to be closer to 50 percent, according to the *Master Plan Phase II for Higher Education* in Illinois.

Junior colleges should employ a director of federal projects to insure that each junior college participates in all the student aid programs as well as developing and writing new projects for federal grants.

Implications For Further Study

This study answered some questions but raised as many as were answered.

Are junior colleges offering programs of instruction which should be reserved to four-year colleges and universities? Many of the high cost programs with low enrollments should be examined more closely by responsible authorities.

Do discipline and subfunction costs described in this study reflect the cost for junior colleges nationally? These cost relationships should be examined in other sections of the United States.

Why do costs vary? The factors which cause cost variations should be isolated, and studies should be made of these factors.

Order No. 72-10,230, 201 pages.

SOURCE SLIGHT FOR SUMMARY OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bass (Last name), Ronald (First name), Earl (Middle name)

Exact Title A COMPARISON OF TWO TEACHING STRATEGIES FOR ORTHOGRAPHIC PROJECTION IN ENGINEERING GRAPHICS: COMPUTER-PRESCRIBED SELF-PACED INSTRUCTION VERSUS THE TRADITIONAL APPROACH

Degree granted Ed.D., Date 1971 No. of pages in report 171

Granted by East Texas State University (Name of institution) Commerce, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

This study was conducted to compare a lecture-demonstration strategy and a computer-prescribed self-paced instructional system in teaching orthographic projection to college-level students in engineering graphics. The control strategy included teacher prepared and presented lectures and demonstrations supplemented by a textbook and a drawing problem workbook. The experimental system employed programmed instruction booklets, information sheets, advanced drawing assignments, supplemental drawing exercises, workbook problems, video tape presentation, film loops, and textbook reading assignments. An individual set of self-paced learning activities was prescribed for each student in the experimental group by a computer program using data obtained from a diagnostic test administered prior to the beginning of instruction.

Procedure

The study population was composed of thirty-one students enrolled in two sections of Engineering Graphics I taught in the Department of Industry and Technology at East Texas State University during the Spring Semester of the 1970-1971 academic year.

Pretests were administered during the third week of the semester and posttests were given during the ninth week after both groups had completed the instructional unit. Criterion measures employed were the diagnostic test given as a posttest and the *Visualization Test of Three Dimensional Orthographic Shape, Form B*. Scores obtained from each of these tests were adjusted by two covariates, the diagnostic test given as a pretest and the *Visualization Test of Three Dimensional Orthographic Shape, Form A*.

Analysis of covariance was used to test the following null hypotheses:

H_1: There is no significant difference between the control and experimental groups in scores on the diagnostic test given as a posttest.

H_2: There is no significant difference between the control and experimental groups in scores on the *Visualization Test of Three Dimensional Orthographic Shape, Form B*.

Findings

When the first null hypothesis was tested, an F-ratio of 1.54 was obtained. Although examination of adjusted criterion means indicated a difference in favor of the experimental group, this F-ratio was not found to be significant at the .05 level of significance and the first null hypothesis was accepted. The F-ratio obtained when the second null hypothesis was tested was .06. Examination of these criterion means also indicated a slight difference in favor of the experimental group. However, this F-ratio was not significant at the .05 level of significance and the second null hypothesis was accepted.

Conclusions

As a result of an analysis of data and of findings that resulted, the following conclusions were drawn:

1. The computer-prescribed self-paced instructional system was as effective as the traditional lecture-demonstration strategy in developing student learning of knowledge of orthographic projection.
2. The computer-prescribed self-paced instructional system was as effective as the traditional lecture-demonstration strategy in developing student ability to visualize three dimensional orthographic shape.
3. The diagnostic test developed for this study was an effective device for assessing each student's previous knowledge of orthographic projection.
4. The computer program written for this study was an effective device for processing diagnostic test data and for assigning individualized student learning activities based upon an evaluation of that data.

Order No. 72-10,789, 171 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bates (Last name), Ivan (First name), Willard (Middle name)

Exact Title THE RELATIONSHIP OF FORMAL EDUCATION TO ACADEMIC ACHIEVEMENT, AND FLIGHT PERFORMANCE IN A TECHNICAL AVIATOR TRAINING PROGRAM

Degree granted Ph.D., Date 1971 No. of pages in report 97

Granted by Florida State University (Name of institution) Tallahassee, Florida (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine if academic achievement and flight performance were related to level of formal education (high school through college) in a technical aviator training program. The secondary objective of the study was to determine if academic achievement and flight performance were related to age and/or score attained on the U.S. Army Flight Aptitude Selection Test (FAST) in a Technical Aviator Training Program.

Six hypotheses were tested: (1) no significant relationship exists between academic achievement and formal education level in aviation training, (2) no significant relationship exists between flight performance and formal education level in aviator training, (3) no significant relationship exists between academic achievement and age in aviator training, (4) no significant relationship exists between flight performance and age in aviator training, (5) no significant relationship exists between academic achievement and FAST score in aviator training, and (6) no significant relationship exists between flight performance and FAST score in aviator training.

The population studied consisted of officer aviator trainees undergoing U. S. Army fixed wing training. The sample consisted of 159 student officers completing the first three phases of flight training in 1970. The three phases of flight training studied are similar in content to Federal Aviation Agency approved programs for private pilot, commerical pilot, multiengine, and instrument pilot ratings.

The educational level of the population ranged from high school graduates to students with graduate school credit. The mean educational level of the group was 14.459 years. The ages of the students ranged from 20 years to 34 years with a mean age of 24.616 years. The scores on the flight aptitude selection test ranged from 169 to 452 with a mean score for the group of 234.940.

Computer programs were used to analyze the data. Analysis of variance to determine statistical significance and stepwise regression program to identify the relationship between variables from the correlation matrix.

The data concerning level of formal education and age indicated that education level and age were significantly related to academic achievement in a technical aviation program. The same variables were not statistically significant to flight performance in aviator training at the .05 level. The FAST was significant to both academic achievement and flight performance in aviator training. The primary flight phase was significant at the .01 level using the F test. The regression analysis produced correlations from indifferent or negligible to a substantial or marked relationship.

Recommendations for further study:

1. That existing research be reviewed to establish priorities and direction of future research.
2. That an aptitude selection test be developed and validated for use in the selection and guidance of technical aviation students.
3. Studies should be conducted in the phases where formal education, age, and FAST were significant to identify the achievement or performance responsible for the variance.
4. Studies should be implemented in the many public secondary school aerospace programs to determine academic achievement and flight performance at that educational level.
5. Studies should be conducted of older age groups to compare achievement and performance.

Order No. 72-13,489, 97 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author BAUGHER (Last Name), Richard (First Name), Wilson (Middle Name)

Exact Title A Comparison of Two Methods of Supervising Students in Descriptive Geometry Classes.

Degree granted Ed.D., Date August,1972 No. of pages in report 165

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose of Study:

The purpose of this research was to compare two methods of supervising students enrolled in college level descriptive geometry classes. The performance and attitudes of students working individually and cooperatively were compared.

Source of data and method of study:

Samples were taken from 391 students who were enrolled in Engineering Design Graphics 106 at Texas A&M University during the spring semester of 1972. The control sections consisted of 195 students who worked primarily on an individual basis. The experimental sections consisted of 196 students who were encouraged to cooperate with each other in the solving of daily laboratory problems.

Findings and Conclusions:

The following conclusions were substantiated by the findings of this research:

(1) Students supervised by the cooperative method earned significantly higher grades on daily descriptive geometry problems than did those students who were not permitted to cooperate with each other.

(2) The students were apparently very much in favor of the cooperative method. A majority of 91.6 percent of the students expressed a preference for being supervised by the cooperative method.

(3) The methods of supervision do not result in a difference in the amount of time required by the students to solve descriptive geometry problems.

(4) There was no significant difference in the grades earned by students on weekly quizzes as a result of the methods of supervision.

(5) There was no significant difference in the final grades earned in the course by students supervised by the two methods.

(6) There was no apparent difference in the attitudes of the instructors toward the two methods of supervision.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bedwell (Last name), Norman (First name), W. (Middle name)

Exact Title A SURVEY OF INDUSTRIAL OR TRAINING SCHOOLS IN FOUR SELECTED SOUTHERN STATES

Degree granted Ed.D., Date 1951 No. of pages in report 148

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this survey is to study and describe as fully as circumstances permit the programs and methods used in the readjustment of delinquent boys in four industrial schools for boys — the Alabama Boys Industrial School, the Florida Industrial School for Boys, the Louisiana Training Institute, and the State Training and Agricultural School for Boys in Tennessee. No attempt is made to determine the effectiveness of the training the boys receive. Particular attention is given to the industrial arts and vocational aspects of the programs.

School officials, teachers, and 373 selected boys were interviewed and all phases of the schools' programs were observed.

A full description of the activities pursued in training the boys is given under the headings of education, citizenship training, character training, leisure time training, industrial arts education, and vocational education.

Under the heading of social influences, the home, the school, and the community are charged with certain responsibility toward the youth. Combinations of circumstances that seem to encourage delinquent behavior are discussed.

The following data concerning general characteristics of the 373 boys are tabulated: age, I.Q., physical defects, type of home, parents' occupation, foreign language, size of families, brothers in the school, time committed, reasons for commitment, gangs, size of cities furnishing boys, and location of cities.

Microfilm copy of complete manuscript of 148 pages, $1.85. Enlargements 6" x 8", 10¢ per page. Library of Congress card number MicA53-1822.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bender, Michael, _____
(Last name) (First name) (Middle name)

Exact Title AN EXPERIMENT USING A VISUAL METHOD OF INSTRUCTION FOLLOWED BY IMITATION TO TEACH SELECTED INDUSTRIAL EDUCATION PSYCHOMOTOR TASKS TO SEVERELY MENTALLY RETARDED MALES

Degree granted Ed.D., Date 1971 No. of pages in report 254

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

STATEMENT OF THE PROBLEM

The problem of this study was to develop, to implement, and to evaluate a program which utilized a method of visual instruction and imitative learning for teaching selected industrial education psychomotor tasks to severely mentally retarded male children.

STATEMENT OF THE PURPOSE

The purpose of this study was three-fold:

(1) To analyze the changes of behavior of severely mentally retarded children as an affect of using a visual-imitative instructional method incorporated to teach industrial education psychomotor tasks.
(2) To provide additional research evidence relevant to observational learning and its use with severely mentally retarded children.
(3) To generate information relevant to procedures helpful to curriculum planners for organizing industrial education programs, sheltered work environments, and special programs for the severely mentally retarded.

DESIGN OF THE STUDY

The design of this experiment was characterized as being a quasi-experimental type with twenty-five subjects comprising a single experimental group. A pretest, posttest, and test for retention were used to evaluate and observe the changes of behavior.

METHODOLOGY

The program employed a visual-imitative method whereby 25 severely mentally retarded male subjects witnessed an adult model perform selected psychomotor tasks. The subjects observed the model perform the tasks and were later instructed to imitate the act. Limited and controlled verbalization was used during the experiment. The three basic commands used throughout the program were (1) "you watch what I do", (2) "now you do what I just did", and (3) "let's do it again". Four sessions made up the visual-imitative program: review, imitation training, task presentation, and practice.

PROCEDURE

The visual-imitative program used for the experiment was developed by the investigator after consultation with professionals in special, industrial, and physical education. The experiment incorporated 9 selected industrial education psychomotor tasks which were demonstrated through a visual-imitative format.

The scores obtained on the performance tests were analyzed for significant differences.

STATISTICAL TREATMENT

The Repeated Measures Analysis was used to treat data gathered through the use of the performance test. Whenever a significant F value was found by the Repeated Measures Analysis, the Scheffe Test was applied.

STATEMENT OF HYPOTHESES

It was hypothesized that there would be observable differences in total test performance scores and subject scores obtained on tasks involving pattern tracing, sanding, nail manipulation, and hammering. These differences would be observed between the pretest and posttest scores, the posttest and retention test scores, and the pretest and retention test scores.

FINDINGS

Statistically significant differences were found at the .05 level between total performance test scores obtained on pretest-posttest, posttest-retention test, and pretest-retention test.

CONCLUSIONS AND IMPLICATIONS

The visual-imitative program was found to be effective for teaching industrial education psychomotor tasks to severely mentally retarded male children.

Although the visual-imitative program was tested with severely mentally retarded children, there was no reason why it would not be successful with children of normal functioning abilities, especially children enrolled in nursery, or kindergarten classes.

Another implication concerns the use of a visual-imitative program in educating or reeducating people undergoing short-term occupational training programs where time may be an important factor. A visual-imitative program eliminates much of the verbalization encountered in such training and allows the participant to observe the demonstration and immediately imitate it.

Order No. 72-10,063, 254 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bettencourt (Last name), William (First name), Leal (Middle name)

Exact Title A SOURCE BOOK OF MATERIALS RELATING TO THE TEACHING OF MECHANICAL DRAWING AS A GRAPHIC LANGUAGE

Degree granted Ed.D., Date 1953 No. of pages in report 268

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X=) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to gather and compile data of an historical nature on the cultural origins and development of mechanical drawing and so to make available to drawing teachers, background material not easily procurable previously which can be used to enrich the presentation of the subject.

The material is presented under the headings (1) introduction, scope of the research involved; (2) drawing through the ages; (3) development of drawing education; (4) influential leaders in the past in the teaching of drawing; (5) drawing instruments; (6) blueprints; (7) standards and their relation to drawing; (8) influential leaders of the present; (9) a drawing classroom - charts and pictures of one which may serve as a guide to better classroom planning; (10) related data sheets - instructional aids which are successfully fulfilling their mission of enriching the subject for the student.

Under these headings mechanical drawing is presented as a universal language with a rich history and cultural background. The origins of drawing education in Europe and subsequent development in the United States is related in some detail.

One chapter is devoted to the biography and accomplishments of men whose influence on the course of drawing education has been outstanding. Another chapter is devoted to describing new ideas and current trends sponsored by influential leaders of the present with biographical sketches of the men behind them.

Drawing instruments, their evolution from earliest times; blueprints, their origins in the Herschel process and subsequent development in the United States are fully described.

Standards, their beginnings and evolution to a point of keystone importance in the American mass production system are discussed. Particular emphasis is placed on those standards now being drawn up for drawing classrooms by the American Standards Association Committee on Drafting Room Practices.

A drawing classroom, built up through a painstaking process of experimentation over a period of twenty years is presented with floor plan and cuts of models and exhibits to serve as a planning guide.

Related data sheets for student use are introduced as instructional aids which help to kindle a student's enthusiasm and convey valuable related background knowledge. These sheets, accumulated in book form, may become the property of the student to keep for reference, as evidence of achievement, or as a momento of high school days.

Microfilm copy of complete manuscript of 268 pages, $3.35. Enlargements 6" x 8", 10¢ per page. Library of Congress card number Mic A53-830.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bettina (Last name) Albert (First name), Anthony (Middle name)

Exact Title THE DEVELOPMENT OF VOCATIONAL-INDUSTRIAL EDUCATION IN NEW MEXICO

Degree granted Ed.D., Date 1953 No. of pages in report 191

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The presentation of the chronological development of vocational-industrial education in New Mexico is one of the purposes of this study. Causative forces in the development of trade training are also considered as part of the background affecting the progress of vocational-industrial education.

Various sources of data were used in the study. The interview was used extensively when people connected with certain programs were accessible. The files of the Division of Trade and Industrial Education contained the chief sources of information concerning the work of that office during the development of trade education in New Mexico. Leading public and private schools in the State were visited and interviews were held with the administrators and trade instructors.

Technical work on the college or university level is not included in the study. Nonvocational courses in industrial arts, arts and crafts, manual arts, or manual training which are offered as a phase of general education are not included. The financial aspect of vocational-industrial education is considered only in general terms for the purpose of relating growth and breadth to funds available.

A resume of the development of New Mexico is presented. Its political history, economic status, and educational beginnings are discussed briefly. A chapter is devoted to the development of vocational-industrial education in the United States culminating in the passage of the Smith-Hughes Act.

The development of vocational-industrial education in New Mexico is presented with the following phases being considered: the work of the Franciscans, United States Indian schools, religious Indian schools, county vocational programs, apprenticeship training, high school programs, veteran's vocational classes, schools for exceptional children, relief programs, defense and war training, certification of trade and industrial teachers, and teacher training.

In tracing the program in New Mexico, consideration is given first to its development up to 1933. Next the influence of the federal relief agencies which appeared about this time is reviewed. This is followed by a presentation of the expanded program resulting from the inception of defense and war training. The subsequent stabilization of trade and industrial education after World War II is traced to the present.

The trade program in New Mexico could not be patterned after that of any other state because of the nature of the population and an economy that is not primarily industrial.

The necessity for a revised vocational-industrial program is discussed. Suggestions are presented for trade-extension and trade-preparatory training.

Microfilm copy of complete manuscript of 191 pages, $2.39. Enlargements 6" x 8", 10¢ per page. Library of Congress card number MicA53-1823.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bies (Last name), John (First name), David (Middle name)

Exact Title ENVIRONMENTAL INFLUENCES ON PROBLEM SOLVING ABILITY IN THREE DEMOGRAPHIC GROUPS

Degree granted Ph.D., Date 1972 No. of pages in report 79

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

1) To ascertain whether or not a relationship existed between environmental factors and problem solving ability, and if so, what type of relationship did exist;

2) To ascertain if a significant difference existed in problem solving ability between students categorized as practical arts, academic or control.

Source of data and method of study·

In the selection of the problem solving instrument, a factor analysis was conducted and the loadings were used in combining the tests selected. A theoretical environmental model was developed, and an information form was developed for collecting data used in the model. A total of 245 students were tested from the three demographic settings and curriculum groups. The demographic groups were identified as urban, sub-urban and rural.

A regression analysis, in a stepwise manner, was used to test the environmental model. An analysis of variance, two-way technique, was used to test the difference in problem solving ability, between the demographic and curriculum groups.

Findings and Conclusions:

A relationship between environmental factors and problem solving ability may be identified with special reference to the following factors: 1) education of parents, 2) occupation of partents, 3) stability of family, 4) family size, 5) persons per room in household, 6) birth rank of individual, 7) membership in organizations, 8) jobs held by individual, 9) regularity of school attendence, and 10) student-teacher ratio. A combination of five factors were significant in identifying problem solving ability, it may therefore be concluded that a relationship does exist between problem solving ability and environmental factors. Since analysis of the data indicated that there was no significant difference in problem solving ability, between the practical arts, academic and control groups, it may be concluded that the environment present in each group was similar in developing problem solving ability. Since the analysis of the data indicated that there was a significant difference in problem solving ability between the suburban and the other two demographic groups, it may be concluded that the environment of the demographic groups were varied enough so as to affect problem solving ability.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Black (Last name), Richard (First name), W. (Middle name)

Exact Title A COMPARATIVE STUDY OF THE DIFFERENCES IN SELF-CONCEPT AND OTHER VARIABLES BETWEEN STUDENTS CHOOSING TERMINAL AND DEGREE PROGRAMS

Degree granted Ed.D., Date 1970 No. of pages in report 141

Granted by University of South Dakota, (Name of institution) Vermillion, South Dakota (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The primary purpose of this study was to investigate the possible differences in perceptions of self between the male students enrolled in two-year terminal vocational-technical programs and the male students enrolled in curricula leading to a baccalaureate degree at Southern State College (SSC).

Additional information regarding the attitudes of the two groups toward various aspects of their college environment was also studied.

Procedures of the Study

Two standardized instruments were implemented in the investigation: the Tennessee Self Concept Scale (TSCS) and the College Student Questionnaire—Part 2 (CSQ-2). The representative sample for each of the two populations included 30 male subjects selected by use of a table of random numbers.

Statistical analysis of the data consisted of an analysis of covariance on each scale of the two instruments. For the purpose of this study the independent variable was the two sample groups representing different levels of types of training and the criterion variable was represented by student performance on each of the scales of the two instruments. The control variable was academic aptitude as represented by the composite score of the ACT for each subject.

Findings of the Study

1. Mean TSCS score differences between the vocational-technical students and the academic students were statistically significant on the Self Criticism Scale. The academic students were judged to be more open to self-criticism than were the vocational-technical students.

2. Mean scale score differences between the two groups of students were statistically non-significant on the Total P Scale, Identity Scale, Self Satisfaction Scale, Behavior Scale, Physical Self Scale, Moral-Ethical Self Scale, Personal Self Scale, Family Self Scale, Social Self Scale, Total V Scale, and the Distribution Scale of the TSCS. The vocational-technical students did not perceive themselves significantly different from the academic students on the TSCS.

3. Mean CSQ-2 scores differences between the vocational-technical students and the academic students were statistically significant on the Extracurricular Involvement Scale and the Liberalism Scale of the CSQ-2. The academic students appear to be involved to a greater extent than the vocational-technical students in the extra curricular activities of the college while the vocational-technical group apparently holds a more conservative set of attitudes toward political-economic-social affairs than do their more academically oriented peers.

4. Mean scale scores between the two groups were statistically non-significant on the Satisfaction with Administration Scale, Satisfaction with Faculty Scale, Satisfaction with Students Scale, Family Independence Scale, Peer Independence Scale, Social Conscience Scale, Cultural Sophistication Scale, Study Habits Scale, and the Satisfaction with Major Scale of the CSQ-2. The vocational-technical students apparently did not perceive the environment of SSC any differently than did the academically oriented students.

5. The group means for the scales of both instruments showed a marked similarity to the normative data supplied by the publishers of the two instruments used in this study.

6. The fact that the cooperating institution serves a relatively small area inhabited generally by a conservative, rural agricultural population may contribute to a homogeneousness of background among the two groups of students thus accounting for their similarity of response on both the TSCS and the CSQ-2.

Order No. 71-12,634, 141 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bland (Last name), Larson (First name), M. (Middle name)

Exact Title A COMPARISON OF THREE METHODS OF TEACHING SELECTED TOPICS OF BASIC ELECTRICITY TO DISADVANTAGED STUDENTS

Degree granted Ed.D., Date 1972 No. of pages in report 123

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To ascertain the relative effects of three methods of teaching selected topics of basic electricity to disadvantaged students upon informational achievement and retention.

Source of data and method of study·

A total of 42 eighth grade disadvantaged students were randomly assigned to three groups for participation in the experiment. The experiment was conducted as a true experiment utilizing a posttest only control group design.

Informationa achievement for puposes of this study was measued by group mean scores on a posttest administered at the close of the instructional period. Retention was measured by group mean scores on the same posttest readministered two weeks after the close of the instructional period. To ascertain the main effects of the treatments, the mean scores of higher and lower IQ students within each group were compared.

Findings and Conclusions:

1. Eighth grade disadvantaged students achieve significantly more information and retain more information when taught by a method which utilized classroom interaction and a summary to verbally reinforce lesson objectives.

2. Eighth grade disadvantaged students with higher intelligence quotients achieve significantly more information when taught by a method which utilizeds classroom interactiont to verbally reinforce lesson objectives.

3. Eighth grade disadvantaged students with higher intelligence quotients can be expected to retain approximately the same amount of information when taught by an interaction, summary, or control method.

4. Eighth grade disadvantaged students with higher intelligence quotients can be expected to achieve approximately the same amount of informationw when taught by methods which utilized classroom interaction or a summary to verbally reinforce lesson objectives. Students with lower intelligence quotients taougt by the interaction and summary method achieve significantly more information than studants with lower intellignece quotients taught by the control method.

5. Eighth grade disadvantaged students with lower intelligence quotients retain significantly more information when taught by a method which utilized a summary to verbally reinforce lesson objectives than when taught by a classroom interaction or control method.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bliss (Last name), William (First name), H. (Middle name)

Exact Title PHOTOGRAPHY IN SECONDARY SCHOOLS: A STUDY OF PHOTOGRAPHY IN GENERAL EDUCATION WITH SPECIAL EMPHASIS ON THE ADVANTAGES OF ITS INTEGRATION WITH INDUSTRIAL ARTS SUBJECTS

Degree granted Ed.D., Date 1953 No. of pages in report 194

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to present a manual which includes data on some existing programs of photography in the secondary schools and methods of organizing the course, with special emphasis on a program of integration. It has been prepared as an aid to school administrators, teachers of photography, and teachers of industrial arts who are considering the introduction or expansion of a program of photography in their schools. It is also intended for use in teacher education.

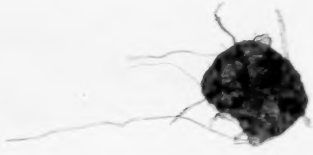
The material is presented under the headings of (1) the development of photography, showing the way in which the science evolved from the early experimentation to the present; (2) photography in general education, outlining some of the contributions photography can make to the general program; (3) suggestions for the content of a course of study in photography, giving a broad range of instructional and activity units; (4) organization of the course, presenting teaching methods and suggestions for organizing a course; (5) organization of the physical plant, suggesting methods of handling supplies and equipment, organization of darkrooms and classrooms; (6) the status of photography in the secondary schools of California, showing the status in 155 high schools; (7) photography as an integral part of industrial arts, under which the organization of the camera club is discussed and the possibility of organizing a completely integrated course of industrial arts with photography as a core; (8) photographic equipment for construction in the industrial arts laboratories, under which is presented eight projects, with construction details, which can take the student into eleven different areas of industrial arts.

It was found that California is a leading state in this field of education, while many other states have very limited or no offerings in photography.

Findings of the study indicate that photography is increasingly being accepted as an important aspect of the secondary curriculum; photography is recognized by many educators as a vital means of enriching the lives of young people through creative experience and the wise use of leisure time; and there is a general interest in, and a demand for, this subject in secondary schools.

Material for this study was found through an examination of books, magazines, newspaper articles, pamphlets, printed technical information, interviews and communications, questionnaires submitted to 594 principals and 199 teachers of photography in the secondary schools of California, inquiries directed to various state departments of education, listed studies in photography, and the practical experience of the writer in teaching photography.

Microfilm copy of complete manuscript of 194 pages, $2.43. Enlargements 6" x 8", 10¢ per page Library of Congress card number MicA53-1824.



SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Block (Last name), Rudolph (First name), Carl (Middle name)

Exact Title A COMPARATIVE STUDY OF THE ACADEMIC PERFORMANCE AND SUCCESS OF COMMUNITY COLLEGE GRADUATES FROM OCCUPATIONAL AND TRANSFER PROGRAMS WHO TRANSFERRED TO FOUR-YEAR COLLEGES AND UNIVERSITYIES IN MICHIGAN

Degree granted Ph.D., Date 1970 No. of pages in report 157

Granted by The University of Michigan, (Name of institution) Ann Arbor, Michigan (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of Problem:

Earlier studies have shown that students enrolled in occupational programs at community colleges who transferred into baccalaureate programs found transfer to a senior college difficult. Almost two-thirds of such applicants had been refused admission (as of 1966) and those who were accepted faced other obstacles. This study reviews the experiences of a group of occupational students who transferred to senior institutions and compares them with a group of transfers from community college academic programs.

Methodology:

The 776 subjects whose records were examined for this study were 1964-66 graduates from nine community colleges in Michigan who transferred to six senior institutions within the same state. The occupational graduates (234) were compared with a selected sample of academic transfers (542) on such variables as cumulative grade-point averages, persistence toward a baccalaureate degree and length of time involved in obtaining that degree. Information was obtained from the registrars' offices of junior and senior colleges and questionnaire responses were received from 340 of the subjects. Several computer programs were used to analyze the data.

Findings:

The average difference in mean GPA between the occupational and academic transfers was .127 of a grade. The hypothesis that there would be no significant differences in GPA between the two groups was partially supported. Significant differences were found between the groups at two of the six senior institutions.

The hypothesis concerning persistence toward graduation received partial support in the analysis. Students from the same two universities went against the predicted pattern: a significantly larger percentage of academic transfers had completed their degree requirements than had the occupational transfers as of September, 1969.

The hypothesis stating that there would be no significant differences between the occupational and academic transfers in the length of time it took to complete the requirements for a degree was supported by the data.

Other comparisons included similarities and differences by sex between the occupational and academic transfers and questionnaire responses to pertinent items such as problems encountered in the transfer process. Over two-thirds of both groups reported the cost factor as being an important influence in the selection of a junior college. Given another chance, over 75 per cent of both groups would choose a community college again for their first two years of higher education.

Conclusion:

Occupational and academic transfer students tend to be similar in more ways than they are found to be different. The differences found in this analysis between these two samples of transfers seem to justify the relatively open door policy Michigan senior colleges and universities have concerning the community college graduate, including those from occupational program areas.

Order No. 71-15,098, 157 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Blomgren (Last name), Glen (First name), Henry (Middle name)

Exact Title A STUDY OF PERCEIVED EFFECTIVENESS AND IMPORTANCE OF VOCATIONAL GUIDANCE IN HIGH SCHOOL INDUSTRIAL ARTS

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine the effectiveness and importance of vocational guidance and occupational information provided in high school industrial arts classes.

Source of data and method of study:

Effectiveness and importance were determined on the basis of stated perceptions of 55 male high school graduates who had taken one or more industrial arts classes while in high school, and of 37 high school industrial arts teachers. These perceptions were obtained by means of interviews, and the study was limited to the Fresno City Unified School District, Fresno, California.

Findings and Conclusions:

1. The vast majority of the students were provided with a number of worthwhile and valuable knowledges and experiences, but vocational guidance was provided for most of the students at far below its potential level.
2. To the extent that the list of statements adequately described a complete package of vocational guidance, overall vocational guidance was more than slightly effective, but not as much as moderately effective. However, the vocational guidance which was perceived to have been provided was well above moderately effective.
3. Vocational guidance in general was perceived to be closer to very important than to moderately important, and even the statements receiving the lowest importance ratings were rated as moderately important. A subsidiary conclusion was that the graduates perceived vocational guidance as more important than the teachers believed they did.
4. Too little occupational information was provided the students in the basic industrial arts classes.
5. Occupational information was, in general, above slightly effective but well below moderately effective. However, the occupational infomation which was perceived to have been provided was somewhat above moderately effective.
6. Occupational information was perceived to be about midway between moderately important and very important.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bogetich (Last name), Thomas (First name), Marion (Middle name)

Exact Title AN ANALYTICAL CASE-STUDY OF REGIONAL OCCUPATION CENTER PROGRAMS IN CALIFORNIA

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1) Document the development and operation of regional occupational center programs (ROCP); 2) Determine whether or not the legislative intent and purposes as provided in the California Education Code have been met; and 3) Establish an effective planning tool or data base for use by school district personnel engaged in the further development of ROCP in the state.

Source of data and method of study:

The study was conducted in two parts: 1) a descriptive survey of programs taht were operational in 1969-70; and 2) an attitudinal survey of approximately 2,600 individuals who were either directly and indirectly involved with six representative programs.

Findings and Conclusions:

1. The pupil-teacher ratio was found to be approximately 19:1. This figure was below the state recommended figure of 24:1 for vocational programs.
2. Considerable effort was expended to provide counseling and guidance services to ROCP studentss and to potential students. This effort was not entirely successful as indicated in the attitudinal survey.
3. Substantial differences among programs were found to exist when an analysis of variance was performed on the combined scores of the Good-Bad, Important-Unimportant, and Successful-Unsuccessful value scales.
4. Twenty-six of the concepts for ROCP acult students were significantly different and 36 of the 40 were different for the ROCP high school students.
5. These results indicate that although the programs are meeting the stated purposes and intent of ROCP's, there are considerable differences among the various programs as to how well they are achieving them, based on the analysis of variance.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bortz, Walter, Raymond
(Last name) (First name) (Middle name)

Exact Title THE RELATIONSHIP OF SELECTED HIGH SCHOOL COURSES TO SUCCESS IN COLLEGE

Degree granted Ph.D., Date 1971 No. of pages in report 294

Granted by The Ohio State University Columbus, Ohio
(Name of institution) (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The study sought to determine what effect high school industrial arts Carnegie units and grades had on college success when these variables were considered at the same time with other measures. The overarching purpose of this study was to provide valid, reliable, and useable information about the college preparatory value of high school industrial arts learning experiences.

The review of the relevant literature was limited to the past 20 years and was subdivided into these sections: (1) high school courses and their relationship with college success, (2) high school grades and their relationship with college success, (3) high school curriculums and their relationship with college success, (4) guidance and counseling concerns and practices, (5) the effect of the high school environment on college success, and (6) predicting college success from high school and precollege profile tests.

The literature verified that high school records could be used to obtain an indication of program effectiveness. However, the variability of the findings of research which was based on an analysis of the impact of high school courses and grades on college success seemed to be caused by: (1) between school variations in Carnegie units, (2) variations in grading between schools, and (3) the variability of the course content in courses with similar titles.

Much evidence is available to question the viability of "tracking" high school students. Research suggests that the basic premises which support placing students in inflexible "tracks" are not defensible.

The study was an ex post facto cross-sectional longitudinal descriptive evaluation of a randomized sample of students who entered The Ohio State University in 1964 with, and without, high school Carnegie units in industrial arts on their high school transcripts. The records of the selected students were followed for 22 quarters. Data was gathered as to how successful each student was at Ohio State, according to a number of variables. The BMD bio-medical computer programs were used to process the collected data in an IBM 360/75 computer. The treatments included the Pearson *r*, stepwise regression correlation, multiple correlation, and contingency tables.

High school industrial arts Carnegie units and grades were related to college final grade point average. Whether or not a student had high school industrial arts did not significantly affect his success in any specific college at OSU. Also, high school industrial arts course grades did not limit a student's opportunity to graduate from any college at OSU.

Recommendations were made for the researcher to: (1) replicate this study at other universities to extend the significance of the findings, (2) determine the feasibility of having accrediting agencies recognize other courses than just the traditionally academic ones, (3) determine the level of guidance acceptance of the findings of this study, (4) determine the relative effectiveness of means of disseminating research which effect guidance practices, with particular emphasis on data reported in this study, (5) conduct a comparable study as to the relationship of industrial arts to success in other post HS activities such as choosing and progressing in vocations, recreational activities, consumer activities, and performance of citizenship duties, and (6) study the feasibility of increasing the flexibility in college admissions requirements.

Recommendations were also made for the practitioner to: (1) discontinue the practice of discouraging college-bound youth from taking industrial arts, at least for students preparing to enter any of the colleges at OSU, (2) not claim the college preparatory merits of one type of IA course over another, based on the findings of this study, and (3) after the requirements of the college a student plans to enter are met, the students should be encouraged to select courses which can provide them with personal goal satisfaction and success.

Order No. 72-4427, 294 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bostrom (Last name), Edwin (First name), Oscar (Middle name)

Exact Title A FOLLOW-UP STUDY OF STUDENTS IN THE BOULDER VALLEY SCHOOLS' VOCATIONAL, TECHNICAL AND GENERAL ADULT PROGRAMS

Degree granted Ed.D., Date 1971 No. of pages in report 223

Granted by University of Colorado (Name of institution) Boulder, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This was a follow-up study of adult education in the Boulder Valley area of Colorado based on data obtained from ex-students of this program. It was designed to show what values this education has had for people in terms of occupational preparation for job entry, upgrading of present skills, job advancement, retraining for different kinds of jobs and for keeping pace with changes in techniques and technology.

The courses taken for other purposes were examined also. Rather than try to make this an all-inclusive study involving elaborate statistical material and examining the many facets of the whole field, this study was designed more as a point of departure for additional study by further researchers. An attempt was made to uncover some of the problems of adult education that have been characterized as "all odds and ends."

If some of these problems can be brought to light so that further research can examine them more closely, then this study will have been of value to the whole field of adult education.

The data were tabulated in categories in an effort to analyze and evaluate: (1) the total amount of job preparation in the various aspects related to full or part-time jobs at present; (2) total avocational course work undertaken and ramifications, if any; (3) total general education of a related nature undertaken and suggested value thereof; (4) total general education in the background of individuals and relevance to past or present occupations; and (5) patterns of age groups, sex, employment and unemployment as they appeared to be related to the training.

Data were gathered to show the percentage of students enrolled in various fields and subsequent employment in the same general field.

The relationships between employment and training and between wages and training were determined and examined.

Another major outcome of this study was in the general field of prognosis and prediction. Such questions as: Where can the most improvement in the program come and what programs seem to be doing the best job for the individuals involved have been at least partially answered.

The major findings and conclusions were: (1) the adult program as presently operated did not reach most of the youth, older persons, and the other disadvantaged groups; (2) counseling and placement services were essentially nonexistent; (3) adult education students did not think very highly of their past elementary and secondary education; (4) adult students tended to be those who were presently employed; (5) the wages of women, whether they are vocational or nonvocationals, tended to be substantially less than those for men; (6) adult programs should make much more substantial efforts to improve high school completion programs; (7) men respondents tended to be in occupations that were changing more rapidly; (8) courses taken by males were more likely to be one of a series, though sequential offerings tended to be lacking; (9) vocational males tended to spend more time in their training than any of the other groups; (10) there is no definite organizational pattern for adult education nor is it included in any substantial way in any of the other school organizations (in spite of its place or lack of it in the continuum of education there is almost no funding for it at any level); (11) there is no universally used coding or classification system for occupational training, placement or reporting.

Order No. 72-3627, 223 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Boutwell, Jr. (Last name), Colen (First name), Jesse (Middle name)

Exact Title EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE

Degree granted Ed.D., Date 1971 No. of pages in report 98

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to ascertain the extent to which the presentation conditions of three second auditory lead and auditory synchronization have an effect on student performance.

Further, the purpose of this study was to investigate the extent to which the strength of grip of the learner has an effect on manipulative task performance.

A total of 52 male seventh grade students without prior instruction in industrial arts was selected. On the basis of a strength of grip test, the students were divided into high and low strength groups. Random assignment within each group was made alternately to two audio-visual treatment conditions. In one condition, the audio and visual presentations of a film were synchronized; in a second condition, the audio was made to lead the visual presentation by three seconds.

A super 8mm film was produced to clearly illustrate the proper procedure for completing the manipulative task (building a toy boat). Audio instructions were provided by a separate tape recorder. Since the treatment conditions called for control of the time relationship between the presentation of the audio and visual elements of the instructional film, a device for this purpose was designed and constructed.

An information achievement test was constructed on the basis of the information presented in the instructional film to ascertain the effects of the treatment variables on student cognitive achievement. This test was administered immediately following presentation of the instructional film.

The task selected for use in this study was similar to tasks typically taught to seventh graders enrolled in industrial arts classes. The performance of the task followed administration of the information achievement test.

A rating scale was developed for the purpose of rating the product produced by the student. Three experienced industrial arts instructors were employed to serve as raters.

A two-way analysis of variance was used to test the effects of treatment condition and the level of strength of grip on the student product measures.

The data revealed that a significant difference existed among the mean scores of the treatment group receiving audio and visual synchronization (19.77) and the treatment group receiving audio leading visual (22.85), indicating the superiority of the latter group.

The data also failed to reveal any significant differences among mean scores obtained on an information achievement test between auditory treatment groups.

The following conclusions may be drawn relative to a manipulative task of similar complexity to that used in this study:

The amount of auditory lead time in an audio-visual presentation is an important factor in learning to perform a manipulative task.

Although there was a positive relationship, the results of this study were not conclusive enough to state that strength of grip is an important factor in the performance of a manipulative task. The data also suggested that auditory lead was more beneficial in manipulative performance for students with low strength of grip than for students with high strength of grip.

Since there was some evidence, though not significant, that auditory lead time is an important factor in student information achievement in an audio-visual presentation, it is suggested that this topic be studied further.

Order No. 72-10,545, 98 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE -AIAA & ACIATE

Author Boyden (Last name), Lloyd (First name), Rogers (Middle name)

Exact Title Relationships Between Students Completing Selected High School Subjects and Achievement by College Industrial Education Students

Degree granted D. Ed., August, 1972, No. of pages in report 70

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study: Data were gathered to test the hypothesis that there is a correlation between first year achievement of Industrial Education students and in the number of credits earned in Industrial Arts subjects in high school. ACT score and achievement were also studied.

Source of data and method of study: The study selected the subjects from the freshman populations for the four-year period from 1967-1970. Although 625 students were admitted, only 400 were selected for the study. These 400 students were selected because they completed the entire freshman year. The data used in this study was analyzed by the statistical method of correlation.

Findings and Conclusions: On the basis of the statistical analysis, the major hypothesis was rejected because the value of all correlations indicated at best a slight or negligible relationship at the .05 level and/or .01 levels.

The following conclusions were drawn based upon the analysis of data from the selected population in Industrial Education at Prairie View Agricultural and Mechanical College. (1) according to the evidence obtained in this study, the American College Test total score is not a good achievement predictor for freshman Industrial Education students at Prairie View Agricultural and Mechanical College; (2) although the number of high school units in Industrial Education completed by the students in this study ranged from 0 to 8, there is apparently no relationship between the number of units earned in high school Industrial Education courses and first-year overall college academic achievement; (3) there is no apparent relationship between Industrial Education courses taken in high school and the first-year college Industrial Education grade point average; (4) there appears to be only a very limited relationship between the American College Test English score and the first year overall college academic achievement; (5) there appears to be only a very limited relationship between the American College Test mathematics score and the first year overall college academic achievement; (6) there appears to be only a very limited relationship between American College Test social science score and the first year overall college academic relationship; (7) there appears to be only a very limited relationship between the American College Test natural science score and the first year overall college academic achievement.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Braun, Robert, W.
(Last name) (First name) (Middle name)

Exact Title CURRICULAR CHOICE, ACHIEVEMENT, AND SELF-CONCEPT IN ENGINEERING TECHNOLOGY PROGRAMS AT A COLLEGE OF ENGINEERING

Degree granted Ed.D., Date 1971 No. of pages in report 86

Granted by Marquette University, Milwaukee, Wisconsin
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This investigation consisted of an attempt to use cognitive and self-concept variables as measured by the Otis Gamma Quick Scoring Mental Ability test (OG) and the Gough Adjective Check List (ACL), respectively to discriminate among students who had successfully completed degree programs in engineering and/or engineering technology at the Milwaukee School of Engineering (MSOE). An adjunct investigation consisted of an attempt to discriminate between pretechnology and freshmen students.

The ACL was administered to students randomly selected from the 1967-1970 candidates for the degree of Bachelor of Science in Mechanical Engineering (BSME group), Electrical Engineering (BSEE group), and Associate in Applied Science in Engineering Technology (AAS group). The ACL was also administered to students randomly selected from the 1967-1970 pretechnology program (PT group) and the 1970 freshman enrollment (F group). The OG scores were obtained from the department of records.

Comparisons of OG and ACL score differences between the degree candidate groups BSME vs BSEE, BSME vs AAS, and BSEE vs AAS was accomplished through the use of t tests. No significant differences were found among the OG scores of the three degree candidate groups. Differences found between the ACL scores of the BSME and AAS groups were not significant. The scores of the BSEE group differed significantly from those of the BSME and AAS groups on 12 of the 24 ACL scales.

Personality profile comparisons based on ACL scale differences indicated that BSME and AAS students described themselves as more socially oriented and less individualistic than the BSEE students. Attempts to differentiate between pairs of degree candidate groups by means of discriminant analyses were unsuccessful.

The use of t tests indicated no significant difference between the OG scores of the PT and F groups, but significant differences were found between the scores of these groups on 21 ACL scales. Profile comparisons indicated that PT students in general have a less favorable self-concept than F students. The discriminant analysis effectively differentiated these two groups of students.

Cross-validation accomplished by substituting ACL scores of student groups, independent of those used in the study, into the discriminant equation resulted in a group placement accuracy of 90%. This value compares with an accuracy of 86% obtained by using the groups involved in the study.

The results of this investigation support the contention that the self-concept of individuals is related to their personal behavior and that measurement of this self-concept should be useful as an aid to curriculum selection.

Order No. 72-5772, 86 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Brennan (Last name), Thomas (First name), J. (Middle name)

Exact Title POTTERY FOR THE INDUSTRIAL ARTS TEACHER

Degree granted Ed.D., Date 1953 No. of pages in report 203

Granted by Bradley Univeristy (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to produce a workbook or small textbook which will enable teachers of industrial arts to offer pottery to their students without benefit of formal training on their part. It might also serve as a text for beginning courses in pottery in secondary schools or teacher training institutions.

The content of the workbook is discussed under such headings as (1) coil pottery; (2) slab pottery; (3) the potter's wheel; (4) turning pottery; (5) the kiln; (6) preparation of glazes; (7) plaster of Paris; (8) fundamentals of design; (9) pottery shop equipment; and (10) safety. Additional information is covered in the appendices and sample instruction sheets on the manner of presenting this material to the student.

The chapter on pottery shop equipment shows drawings of all of the necessary equipment to conduct pottery classes. This equipment is shop-designed and shop-made, using inexpensive or salvage materials. Suggestions are given concerning procuring the materials for constructing the equipment. The equipment was made from the drawings and tried out under actual shop conditions as a manner of testing its worth. In some instances similar equipment has been in use for over ten years.

Under the above headings, fabrication of clay objects is clearly explained. Illustrations in the form of pictures of students doing the manipulations are given. Additional illustrations are offered as drawings which supplement the pictures and make the fabrication procedures plain to the reader.

A short bibliography is given at the end of the text and includes, for the most part, less expensive or workbook type titles. It is offered merely to supplement the work, not to validate it. It was thought that the work would have more value if it was the result of experimentation rather than research.

The information and job sheets offered in the appendices are furnished merely as guides to the development of similar material by the reader. It was felt that each situation is different and demands a different treatment. The reader should be able to develop material which fits his situation much better than the material of the text.

Microfilm copy of complete manuscript of 203 pages, $2.54. Enlargements 6" x 8", 10¢ per page. Library of Congress card number MicA53-1826.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Brewster (Last name), James (First name), Hiram (Middle name)

Exact Title A STUDY OF AN EMERGING OCCUPATIONAL GROUP: STATE DIRECTORS OF LAW ENFORCEMENT TRAINING: THEIR BACKGROUNDS AND PERCEPTIONS OF THEIR ROLE

Degree granted Ed.D., Date 1971 No. of pages in report

Granted by The George Washington University (Name of institution) Washington, D.C. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To identify and analyze the role perceptions of State Directors of Law Enforcement Training, To draw a profile, and to ascertain their views regarding current problems in law enforcement education and training.

Source of data and method of study·

The literature, which was reviewed relative to role, to role within the occupational group, and to professional associations, indicates a general belief that individuals do develop a role concept within their environment and that associations do tend to positively affect professionalization within the occupation.

To establish a perspective of the field of law enforcement training, the historical development of law enforcement in the United State was briefly stated, contributions of the Federal government were reviewd, and contributions in the various states were noted.

A questionnaire was developed, tested, and administered to State Directores who are also active members of the National Association of State Directors of Law Enforcement Training, A return of 90 per cent was received.

Findings and Conclusions:

1. The State Directors attempt to define which competencies are needed by their staff personnel.
2. The study be replicated with the associate memebers of the Association to determine their perceived role and thereafter to develop educational and experiential standards.
3. The study be extended to law enforcement trainers within the various states in an effort to identify areas of need.
4. Key personnel be developed who are competent in preparing proposals to obtain grants.
5. State Directors working with their Association consider establishing a consultant service,
6. State Directors consider conducting a specific job survey to determine what is being done and what should be done.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Briggs (Last name) Lloyd Delano (First name) , (Middle name)

Exact Title BASIC COMPETENCIES NECESSARY FOR ADMINISTRATORS OF VOCATIONAL AND TECHNICAL EDUCATION

Degree granted ED.D. , Date 1971 No. of pages in report 115

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Scope of Study: The primary purpose of this study was to have practicing vocational-technical education administrators and their chief school officers rate, in terms of their relative importance, a set of selected competencies which might be considered necessary for effective administration in vocational and technical education, and, based on these ratings to organize the competency items in a hierarchal fashion.

The study analyzed data from 100 vocational-technical education administrators who represented area vocational schools, metropolitan school systems, and junior colleges and 93 chief school officers from these same institutions. Competency ratings were compared among vocational-technical administrators from each of the three types of institutions represented, among chief school officers from the three types of institutions, between vocational-technical administrators and chief school officers within the same types of institutions, and between the vocational-technical administrators and their chief school officers as a total group.

Findings and Conclusions: An analysis of the data resulted in the following conclusions: Vocational-technical education administrators of area vocational schools, metropolitan school systems, and junior colleges indicated general agreement on the relative importance of a set of competencies which they considered to be necessary for administrators in positions similar to theirs.

All competency items on a 40-item questionnaire received relatively high ratings by the respondents. Based on the ratings, the competencies were arranged in a hierarchal order to indicate the importance of each one in relation to the others.

In comparing responses from the total group of vocational-technical administrators with those of their chief school officers as a group, several significant differences were detected. In each case of significant differences, however, the vocational-technical administrator had rated the competency item notably higher than had the chief school officer.

Order No. 72-21,837, 115 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Brown (Last name), Walter (First name), E. (Middle name)

Exact Title THE DEVELOPMENT AND VALIDATION OF AN OCCUPATIONAL COMPETENCY EXAMINATION FOR THE SELECTION OF CHEMICAL TECHNICIANS

Degree granted Ed.D., Date 1971 No. of pages in report 122

Granted by Rutgers - The State University of New Jersey (Name of institution), New Brunswick, New Jersey (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The purpose of this study was to develop and validate an occupational competency examination for use in selection and promotion of chemical technicians.

Source of data and method of study:

A representative sample of 61 subjects was randomly drawn from a total pool of over nine hundred chemical technicians employed by the cooperating concerns which included each major type of industry employing chemical technicians.

A performance type chemical technician competency examination was developed with the use of behavioral analysis. The standardization procedure used was to administer the examination to four representative groups of practicing chemical technicians.

Findings and Conclusions:

1. No: There is no significant difference amoung the scores of the four groups of subjects as determined by the examination. The null hypothesis was rejected.
2. No: There is no significant difference between the scores of any two groups of subjects as determined by the examination. The null hypothesis was rejected.
3. No: There is no significant correlation between supervisor ratings and the examination scores of subjects. The null hypothesis was rejected.
4. No: There is no significant correlation between the examination scores awarded the subjects by different raters. The null hypothesis was rejected.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bruntlett (Last name), John (First name), Eugene (Middle name)

Exact Title A COMPUTER ASSISTED SIMULATION TO PLAN THE PROGRAM OF AN AREA VOCATIONAL SCHOOL

Degree granted Ed.D., Date 1973 No. of pages in report 188

Granted by Utah State University (Name of institution) Logan, Utah (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To develop a model of the process of planning the program of an area vocational school. To write a digital computer program implementing the model of the process involved in planning the program of an area vocational school.

Source of data and method of study·

Review of literature.
Synthesis of information.

Findings and Conclusions·

1. The program planning model can produce a program based on manpower, community and student needs and compare it to an existing program.
2. Realistic results were obtained when actual data from an existing school district was used as input information to the computerized planning model.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Bowlan (Last name), Sizemore (First name), _____ (Middle name)

Exact Title AN EVALUATION OF SELECTED CRITERIA FOR ASSESSING THE EFFECTIVENESS OF ADULT VOCATIONAL EDUCATION IN THE OKLAHOMA CITY PUBLIC SCHOOLS AS PERCEIVED BY THREE RESPONDENT GROUPS

Degree granted ED.D., Date 1971 No. of pages in report 119

Granted by Oklahoma State University (Name of institution), Stillwater, Oklahoma (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose: The purpose of this study was to develop an instrument that could be used in evaluating, up-dating, and improving the quality of the adult vocational offerings of the Oklahoma City Public Schools.

Scope and Method of Study: This study involved two somewhat separate studies coordinated into one: namely, (1) the development of criteria by a panel of experts for determining effectiveness of adult vocational-technical programs, and (2) the rating of these criteria by five different adult groups. Eight experienced adult vocational administrators, via the Delphi technique, identified the twenty-two criteria they considered most important in assessing the effectiveness of an adult vocational program. Criteria, so developed, were then rated by the panel and concurrently by 396 adults participating in vocational education programs offered by the Oklahoma City Public Schools during the 1970-71 school year. In order to secure respondents' reaction toward the evaluative criteria and to facilitate comparison of these reactions, each criterion was rated using an eleven-point rating scale. All questionnaires, except to the panel of experts, were administered personally by the investigator.

Findings and Conclusions. Although adult vocational education programs vary in their emphases and purposes, it was observed by the investigator there are commonalities of objectives that warranted a study to determine criteria that could be used in assessing the effectiveness of an adult vocational program. The overall mean response by the 404 participants to each criterion served as an indicator in determining the importance of this particular criterion in relation to the other established criteria. Criteria to be used in evaluating the effectiveness of an adult program, as recommended by the panel of experts, were listed in order of importance, as was determined by the overall mean response by the study participants. Those criteria receiving the highest ratings included: (1) qualifications of staff, (2) sufficient funds are available for operation of program, (3) an increase in knowledge or improvement of skills by those enrolled in program is evidenced in job placement, increased responsibility, salary increase and/or improved employer-employee relations.

Order No. 72-21,834, 119 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Boxx (Last name), William (First name), Randy (Middle name)

Exact Title TRAINING FOR SKILLS THROUGH AREA VOCATIONAL-TECHNICAL SCHOOL IN THE STATE OF ARKANSAS

Degree granted Ph.D., Date 1972 No. of pages in report 298

Granted by University of Arkansas (Name of institution), Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The research findings supported an affirmative answer to the study's primary question. That is, employers in the State of Arkansas should hire electricity and electronics students trained by the State's area vocational-technical schools. Responses from both the 1969-70 electricity and electronics students of the area vocational-technical school programs and the employers of such students were obtained through personal contact or a mail questionnaire. The student-employee questionnaire and the employer questionnaire each contained six sections, with each section specifically designed to elicit related data for answering the basic question of the study. The following conclusions were drawn from the findings of the study.

The majority of the employers perceived the image of the vocational-technical schools to be only fair. The schools were sometimes regarded as attractive only to dropouts or to those seeking a cheap education. The employers, as well as the student-employees who were previously enrolled in the schools, did regard these opinions as ill-founded. The trained students were regarded as possessors of the skills and abilities required by business. They required additional training in certain areas, but the vocational-technical students required a smaller amount of time to become successfully prepared for the job than non-students did. It was asserted that the general public should be informed of the importance and value of the skilled occupations, and hence the value of the vocational-technical schools.

The counseling and placement services of the vocational-technical schools were detected as areas worthy of improvement. A frustrating situation was created for many of the students once they sought employment. The areas surrounding the schools where students desired employment had only a few job openings related to the training the students had received. It appeared to these students that electricity and electronics training had been provided for jobs which were not available. There was agreement among the students that, before they selected the course, the counselor should have provided a proper explanation of the implications of the training.

Concerning the area of employer recruitment and involvement with the schools, it was found that the employers were supplied with an adequate number of trained electricity and electronics student-employees. However, only a small number of the employers actively recruited these students. There was a common feeling among these employers that a person with previous work experience in the field was preferred to a person who had no actual work experience. Most of the students did not qualify on that basis. Nevertheless, the students' training could be made more comparable to what was needed on the job if additional practical experience was provided through an increase in shop or laboratory work.

Employer involvement in the electricity and electronics training program was negligible. Furthermore, the businesses visited were becoming increasingly concerned about their lack of participation in vocational-technical training programs. A strong desire by the employers to participate in the development and revision of currently-offered curricula existed.

The final conclusions were related to the program's content and instruction. Differences were found to exist between the areas emphasized in the course and the areas considered by the student-employees and the employers to be most important for the successful performance of the job. Both parties were concerned with these differences, for areas of weakness were specified in relation to the student-employees' degree of preparation for the job. It was felt that, with certain changes in the relative emphasis given these areas, the electricity and electronics course could be improved for better training the end-products of these schools. The instructors were considered marginal only in relation to the areas not presently covered in the training program.

Recommendations were developed for the above areas in an effort to improve the electricity and electronics training programs offered by Arkansas' area vocational-technical schools.

Order No. 72-10,176, 298 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Burgett (Last name), Donald (First name), Covel (Middle name)

Exact title THE DEVELOPMENT OF A PROCEDURAL MODEL FOR MAKING EFFECTIVENESS/COST EVALUTION S OF OCCUPATIONAL EDUCATION

Degree granted Ph.S., Date 1970 No. of pages in report

Grante by Cornell University (Name of institution) Ithica, New York (City State)

Where vailable: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpos of Study

Te major purpose of this study was to develop a procedural model for use in maing effectiveness/cost evaluations of programs of occupational education. The prpose was to apply the model to a program of occupational education to try out te procedures contained in the model.

Source of data and method of study

Te model and the procedures for applying it were developed after extensive revie of the literature was conducted to develop a theoretical framework upon whichthe model could be based. Included in the search were areas of controversy in evluation which were explored to provide the rationale for the model.

Aplication of the procedures outlined in the model to a case study of occuptional education resulted in the listing of program objectives for each area f instruction at the occupational school and the development of effectiveness measues for measuring the extent of achievement on each objective. The effeciveness measures were incorporated into questionnaires for graduates and theiremployers which were then field tested and revised. Cost measures were develped to gather data regarding operating costs of the occupational program.

Findigs and Conclusions:

Te model provides adequate direction for creation of effectiveness/cost evalution instrument. The model is feasible for use in evaluating educational progrms. Effectiveness/cost evaluations produce valid data for use in improving educaional programs. Educational programs at all levels can make use of the modelto evaluate their programs. Most of the effectiveness measures created durin this trial evaluation can be used for evaluations of any area of instrction having the same objectives. The resources required for the conduct of aneffectiveness/cost evaluation are well within the capability of the typicl school system.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Burns (Last name), Richard (First name), L. (Middle name)

Exact Title FACTORS GOVERNING THE ESTABLISHMENT AND OPERATION OF AREA VOCATIONAL TECHNICAL SCHOOLS AND PROGRAMS IN THE UNITED STATE WITH APPLICATION TO MISSOURI

Degree granted Ed.D., Date 1964 No. of pages in report 285

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To investigate the conditions, the principles, and the practices under which area vocational-technical programs have been established and operated in the United States and to apply the findings to the state of Missouri.

Source of data and method of study:

Information forms were mailed to 50 state directors of vocational education. A second information form was sent to 465 local directors of area vocational-technical schools and programs in 42 states.

Findings and Conclusions:

1. In the process of establishing area vocational-technical schools or programs, a study should be made of the employment opportunities, employere support, student interest, and voter approval.

2. If an area vocational-technical school or program is to be established in conjunction with a junior college, it is advisable to integrate offerings and administration of the vocational program with that of the junior college. A minimum of between three and six occupational areas have been found necessary to have a successful area vocational-technical school.

3. A workable administrative pattern for an area vocational-technical school or program would be one in which a qualified director of vocational education executes administrative policy.

4. Desirable state legislation for the establishment and operation of area vocational-technical schools and programs would provide for the acceptance of students in a curriculum not offered in the school serving the area in which the student resides: it should appropriate funds for buildins for such schools: and it should permit two or more school districts to cooperate in teh establishment of an area vocational-technical program to serve their area.

5. When the findings are applied to Missouri, 22 areas result which could be served by area vocational-technical schools. Some of these tentative areas could well be served by a vocational-technical program whithin a junior college, or perhaps a comprehensive high school.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Calhoun (Last name), Marjorie (First name), Rogers (Middle name)

Exact Title DEVELOPING AND FIELD-TESTING READING MATERIALS FOR USE WITH AUTOMOTIVE MECHANICS STUDENTS IN VOCATIONAL-TECHNICAL PROGRAMS

Degree granted Ed.D., Date 1970 No. of pages in report 274

Granted by University of Georgia, (Name of institution) Athens, Georgia (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary problem of the study was the development of materials for a course in Communication Skills, with emphasis on reading skills, for post-secondary auto mechanics students.

The Procedures

The following procedural steps were employed in the development of the materials:

1. Determination of communication tasks of the student and mechanic;
2. Identification of broad skill areas;
3. Formulation of terminal student objectives;
4. Development of course outline;
5. Construction of exercises;
6. Tryout of materials.

The Materials

Materials developed were aimed primarily at the teaching of reading skills using automotive content and vocabulary. Exercises included vocabulary, word attack skills, locational and reference skills, and comprehension skills.

Evaluation

The evaluation of materials developed was based on observation and student response from one class of Communication Skills which met for one hour per day, five days per week, for one quarter. The materials were found to be useful in the development of reading skills necessary to achieve terminal objectives of the Communication Skills course. Use of specific exercises with any given student would depend upon reading competencies already possessed by that student.

Order No. 71-13,031, 274 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Callaway, Rolland, L.
(Last name) (First name) (Middle name)

Exact Title THE GENERAL SHOP: AN INTERPRETATION

Degree granted Ed. D., Date 1953 No. of pages in report 311

Granted by Bradley University, Peoria, Illinois
(Name of institution) (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

This study presents an interpretation of the general shop. The general shop represents one of the outstanding types of industrial arts programs consistent with the tenets of modern education. However, in many instances the development of the general shop has not been in accordance with an evolving philosophy of education, and in turn an evolving philosophy of industrial arts.

This study attempts to present the beginnings and development of the general shop program, also considering the implications and effects of curriculum organization on that program.

The study has been divided into three principal parts. Part I concerns the meaning of the term "general shop." An attempt has been made to present a "common meaning" with the aid of a semantic orientation. The general shop concept consists of primary and secondary characteristics. The primary characteristics of the general shop are discussed in terms of a philosophy of education and a philosophy of industrial arts. Secondary characteristics are listed as those physical components of a shop program which designate it as "general shop."

The second part of the study concerns the beginnings and early development of the general shop. The general shop has been a part of a manual training, manual arts, and industrial arts heritage. It has been shown that the general shop has gradually developed from the characteristics of the various programs of manual work in our schools. An effort has been made to relate the development of the general shop to the educational advances which have been made since the latter part of the nineteenth century.

The last part of the study considers the implications and effects of curriculum organization on the general shop program. Industrial arts has been recognized as an integral phase of general education. The general shop is considered in this study as a method of organizing the industrial arts program or as synonymous with the term industrial arts. The general shop program as it exists in a particular school becomes a phase of general education and should be consistent with the total curriculum organization of the school.

For the purposes of this study curriculum development has been divided into three major phases — the subject curriculum, the activity curriculum, and the core curriculum. The characteristics of the general shop have been discussed in relation to the characteristics of these three types of curriculum organization. This has been done in an effort to point out the type of general shop program which is consistent with a specific curriculum organization.

Changes in the organization of the curriculum have resulted in the propagation of the general shop program. The increasing popularity of the general shop can be shown by the following trends:

1. Emphasis on individual needs and interests
2. Increasing number of areas and activities
3. Correlating shop activities with other phases of the curriculum
4. The arts workshop
5. Pupil freedom
6. Demand for shop facilities at all levels
7. Development of creative ability and sensitivity

In conclusion this study presents the general shop as an evolving philosophy of industrial arts from the standpoint of a manual training, manual arts, and industrial arts heritage. Also a concept of general shop is presented in terms of a philosophy of American education. The general shop is discussed as a phase of general education which should be consistent with the characteristics of the curriculum organization of the school. All of this study is related to a semantic orientation — from the development of a common meaning of the general shop to the succeeding discussion carried on under the discipline of semantic principles.

Microfilm copy of complete manuscript of 311 pages, $3.89. Enlargements 6" x 8", 10¢ per page. Library of Congress card number MicA53-1928.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Cambell (Last name), Clifton (First name), Paul (Middle name)

Exact Title AN ANALYSIS OF NUMERICAL CONTROL, TO IDENTIFY AND DESCRIBE ITS ELEMENTS

Degree granted Ed.D., Date 1971 No. of pages in report

Granted by University of Maryland (Name of institution) College Park, Maryland (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The problem of this study was to conduct a systematic analysis of numerical control. Answers were sought to the following questions: 1. What were the elements of numerical control? 2. What would be an appropriate description of each element?

Statement of the Purpose

The purpose of this study was to develop an organized body of descriptive data concerned with numerical control. These data have value to industry and education, as well as to the development of general understandings about numerical control technology.

Procedure

A search of the literature revealed information which provided the means for the identification and description of the elements of numerical control. A tentative list of twelve elements of N/C was compiled from a content analysis of eleven books directly related to the area of N/C technology. A tentative list of the sub-elements which would form the content of each of the twelve elements of N/C was then obtained through an analysis of the literature on N/C technology. Consultants provided information and recommendations which aided in the identification of the elements and sub-elements of N/C. Four categories into which the elements could be appropriately placed were determined through a review of the literature on N/C technology and interviews with the consultants. These categories provided the organization for grouping the twelve elements to facilitate their description.

A data gathering instrument was developed and submitted to twenty-five experienced professionals in the field of N/C technology, participating as jury members, to ascertain their judgments on the elements and sub-elements of N/C and the categories into which they placed each element. Data derived from the instrument provided evidence that twenty-five experienced professionals in N/C technology were in substantial agreement that all twelve elements identified were elements of numerical control. These data provided evidence that the jury members were also in substantial agreement concerning the categories into which the elements of N/C could be appropriately placed. From these data the following outline of categories and elements was developed to provide organization for grouping the elements and to facilitate their description.

Input category
- Input Media
- Coding System
- Tape Standardization
- Tape Preparation Equipment

Processing (control system) category
- Machine Control Unit
- Servomechanisms
- Feedback Systems
- Positioning Systems

Programming category
- Measuring System
- Manual Programming
- Computer-Assisted Programming

Controlled equipment (machine) category
- Operational Device

Each of the twelve elements was then completely described under the category into which it was placed.

Conclusions

The following conclusions were based upon evidence presented by this research in terms of the problem and purpose.

1. The elements of numerical control were:

   Input Media
   Coding System
   Tape Standardization
   Tape Preparation Equipment
   Machine Control Unit
   Servomechanisms
   Feedback Systems
   Positioning System
   Measuring System
   Manual Programming
   Computer-Assisted Programming
   Operational Device

2. The categories of numerical control elements were:

   Input
   Processing (control system)
   Programming
   Controlled equipment (machine)

3. The elements of numerical control could be appropriately described through an organized body of data.

It is believed that these findings will provide a sound basis for the development of general understandings about numerical control technology.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Canada (Last name), Brian (First name), Lee (Middle name)

Exact Title SIGNIFICANCE OF PROPRIETARY SCHOOL LAW

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine the significant differences in judgements between state administrators of proprietary schools and administrators of vocational proprietary schools relative to adequacy of vocational proprietary school laws. The secondary purpose was to develop the basis for a criteria which could serve as a guide for interested groups and individuals involved with proprietary school law revision or enactment.

Source of data and method of study:

The data from the two groups of respondents were secured during the 1970-1971 university academic year by means of mail response and personal interview.

A data gathering device entitled, "Judgements of State and Vocational Proprietary School Administrators Relative to the Adequacy of Proprietary School Laws," was mailed to each of the respondents of each group te secure their reactions and judgments in determining the degree of adequacy of the 52 provisions of law ranging from inappropriate to exemplary on a five degree scale.

Findings and Conclusions:

1. The 28 provisions of law that supported the null hypothesis should be considered as the basis for a criteria to guide interested persons and groups in the enactment or revision of proprietary school laws.
2. The 24 provisions of law where the null hypothesis was rejected should be subject to further analysis, clarification and review before being considered for enactment or revisions of proprietary school law.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE &NAITTE

Author Carpenter (Last name), Thomas (First name), Eugene (Middle name)

Exact Title AN ANALYSIS OF SELF-CONCEPT CHANGE IN TECHNICAL INSTITUTE STUDENTS ENROLLED AT CALDWELL TECHNICAL INSTITUTE BETWEEN 1967 AND 1971

Degree granted Ed.D., Date 1971 No. of pages in report 100

Granted by North Carolina State University (Name of institution) Raliegh, North Carolina (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

In this study the author investigated effects of a curriculum program on the self-concept of 326 students enrolled at Caldwell Technical Institute between 1967 and 1971. The students were divided into the foflowing groups: Those who were high school graduates enrolled in the day program (N=218), high school graduates enrolled in the night program (N=40), non-high school graduates enrolled in the night program (N=28), and non-high school graduates enrolled in the day program (N=40). Self-concept changes were examined in relation to age, intelligence, length of enrollment, and educational accomplishment.

The study was based upon theoretical postulations, presented by numerous psychologists and sociologists, which indicated that self-concepts do develop over a period of time and that several variables do influence this development. Data were collected using the Lorge-Thorndike Non-Verbal Intelligence Test the Tennessee Self-Concept Scale and a personal data sheet supplied by the technical institute.

The summary of the correlations and the t-scores indicates that there is positive correlation, significant at the .01 level of confidence between the length of enrollment and self-concept change for the Total Group in the study. A positive correlation, significant at the .01 level of confidence, was also indicated between mental ability and self-concept change for the Total Group and for both of the High School Groups. The correlation was significant at the .05 level only for the Non-High School Day Group. A correlation, significant at the .05 level, was also shown for the Total Group involving age and self-concept change. It should be noted that there was a negative correlation, although not significant, between age and self-concept change for the High School Night Group. There was also a negative correlation between age and self-concept change for the Non-High School Day Group. This correlation was significant at the .05 level only.

The Non-High School Night Group had a negative correlation significant at the .05 level between age and self-concept change.

A significant relationship between mental ability and self-concept change was indicated by all groups in the study except the Non-High School Night Group.

A high positive relationship was also shown between accomplishment and self-concept change for the group under study.

Order No. 72-17,730, 100 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Case (Last name), Merl (First name), Edward (Middle name)

Exact Title THE APPLICATIONS OF COMPUTER GRAPHICS IN INDUSTRY AND IMPLICATIONS FOR DRAFTING CURRICULUM ON THE COLLEGE LEVEL

Degree granted Ed.D., Date 1971 No. of pages in report 173

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to ascertain the status of computer graphics in selected companies and selected industrial education institutions, and to derive guide lines from the identified data for computer graphics curriculum planning within industrial education departments of colleges and universities.

Procedures

The data for the study were obtained through the use of two questionnaires. The first questionnaire was sent to 129 selected industrial educators. The second questionnaire was sent to thirty-two selected industrial personnel employed by companies using electronically controlled plotters in the manufacture of a product.

Selected Findings

1. Ten of the industrial educators indicated their school offered at least one course in computer graphics within the industrial arts department.
2. Computer graphics was not a required course for industrial arts majors in any of the selected schools.
3. All of the schools offering computer graphics as a course within the industrial arts department were offering nineteen or more semester hours of drafting, whereas only 37.6 per cent of the total participating population were offering nineteen or more semester hours.
4. Applications for engineering drafting were being made by 70.6 per cent of those responding from industry, and by 58.8 per cent for numerical control tape production and verification.
5. Twenty of the thirty-five plotters being used by the participating industrial population were of the flatbed type.
6. The six courses listed by industrial respondents as being the most beneficial in preparing them for work in computer graphics were: computer science, descriptive geometry, algebra, mathematics (through calculus), and numerical analysis.

Selected Conclusions

1. Industrial arts teacher education institutions are offering computer graphics only on a limited basis.
2. The schools offering computer graphics as a course within the industrial arts department may be expected to offer more hours of drafting and offer a degree program other than education.
3. Insufficient funds and lack of facilities were the primary reasons for not offering computer graphic courses within the industrial arts department.
4. A majority of the schools have equipment available, with the exception of a plotter and control, to teach a course in computer graphics.
5. While some industries are making minimal use of the electronic plotter, other industries are using it exclusively in the making of drawings.
6. The primary application of computer graphics in industry is to depict engineering drawings.
7. Speed, cost saving, and accuracy are the reasons for the utilization of computer graphics by industry.
8. Industries utilizing computer graphics are using the standard input and storage devices that are used for other computer applications.
9. The industries utilizing computer graphics may be expected to develop their own programming system.
10. Personnel working in computer graphics in industry may be expected to have received their training in a four-year college and/or on the job.

Selected Recommendations

1. Industrial educators should evaluate their present curriculum and consider the addition of computer graphics to help students better interpret contemporary industry.
2. A program for computer graphics should provide both undergraduate and graduate industrial arts students enough flexibility and an opportunity to develop a basic understanding of the following areas: computer science, mathematics, and drafting.
3. Industrial arts personnel desiring to add computer graphics as a course within the department should cooperate with the central computer center personnel to locate the plotter and the peripheral equipment required for hands-on experience within the computer center to eliminate the duplication of equipment and facilities.

Order No. 72-13,306, 173 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Cassimatis (Last name), Peter (First name), J. (Middle name)

Exact Title THE PERFORMANCE OF THE CONTRACT CONSTRUCTION INDUSTRY, 1946-1965

Degree granted Ph.D., Date 1967 No. of pages in report

Granted by New School for Social Research (Name of institution) New York, New York (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

A major problem in the study of the economics of the construction industry has been the measurement of the growth of productivity; also the source of productivity in the growth in construction, principally the economies of scale.

Source of data and method of study:

Application of a variety of techniques, including cross-sectional and time-series regressions, and his conclusion that they are unimportant is well supported.

Findings and Conclusions:

The rate of growth of productivity in the economy generally has been faster than that of the construction industry.

SOURCE SLIPT FOR ABSTRACT OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Cauley (Last name), Michael (First name), Jon (Middle name)

Exact Title INDUSTRIAL ARTS AND ENVIRONMENTAL EDUCATION: ENVIRONMENTAL CONCEPTS JUDGED APPLICABLE TO INDUSTRIAL ARTS TEACHING AREAS BY INDUSTRIAL ARTS TEACHER EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 151

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to develop a concrete relationship between industrial arts and environmental education. An overall attempt was made to identify which environmental education concepts should be taught in industrial arts as a subject matter area and more specifically which environmental concepts should be taught in the various teaching areas within the traditional industrial arts programs.

Method of Study

A list of environmental concepts originally prepared by Robert Earl Roth in a doctoral study completed in 1969 formed the basis for this study. This list of concepts numbering 111 was sent to a jury of 7 qualified persons in the area of industrial arts. These jury members were asked to select those of the 111 concepts to which industrial arts could make the greatest contribution. A narrowed list of concepts resulted.

The narrowed list was then sent to an identified population of industrial arts teacher educators who were specialists in specific teaching areas and met certain specified qualifications. This population was asked to categorize each of the environmental concepts in the narrowed list of 53 into one of three possibilities: applicable to my teaching area; applicable to industrial arts, but not to my teaching area; or not applicable to industrial arts. Of the 673 concept lists mailed, 387 were returned with 313 of those having sufficient information to be included in the study.

Selected Findings

It was found from the analysis and interpretation of the figures from the industrial arts teacher educators that all of the environmental concepts were considered applicable to the industrial arts teaching areas at the 66 per cent level of agreement except one. More specifically it was found that the industrial arts teacher educators could identify which environmental concepts should be taught in the various identified teaching areas in industrial arts. Based on the number of concepts found applicable to each of six teaching areas, electronics not receiving any concepts, percentage figures of the total were derived. Metals received 3.8 per cent of the concepts, graphic arts 3.8 per cent, plastics-crafts 3.8 per cent, drafting 17.3 per cent, power 23.1 per cent, and woods 48.1 per cent. Each of the six teaching areas is listed below with a representative concept that was found applicable to it:

1. Metals—Minerals are nonrenewable resources.
2. Plastics-crafts—Pollutants and contaminants are produced by natural and man-made processes.
3. Graphic arts—Water is a reusable and transient resource, but the available quantity may be reduced or quality impaired.
4. Drafting—Man has ability to manipulate and change the environment.
5. Power—The nonrenewable resource base is considered finite.
6. Woods—Natural resources are interdependent and the use or misuse of one will affect others.

Conclusions

Because the population consulted in this study indicated that fifty-two of the fifty-three concepts were applicable to industrial arts at the 66 per cent level of agreement, it can be concluded that there is a concrete relationship between industrial arts and environmental education. A second conclusion is that the concepts used in this study should be included in the traditional industrial arts teacher educator programs and would be best suited to the total subject area of industrial arts. More specifically, certain concepts should be taught in distinct teaching areas within the whole of the industrial arts program. Indications were that all but one of the teaching areas should teach from two to twenty-five of the environmental concepts. This further indicated that there is a part for industrial arts to play in the educational process dealing with man's relationship with his natural and man-made surroundings.

Order No. 72-13,307, 151 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Chastain (Last name), Gary (First name), Kent (Middle name)

Exact Title EFFECTS OF VISUAL AND VERBAL PRESENTATIONS UPON THE PERFORMANCE OF A PSYCHOMOTOR TASK

Degree granted Ed.D., Date 1972 No. of pages in report 124

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain the relative effects of pictorial, pictorial and suditory-verbal, pictorial and visual-verbal, or pictorial, auditory-verbal and visual-verbal presentations upon 1) the learning of a psychomotor task by high and low mental ability groups, and 2) the amount of time these groups would take to complete the task.

Source of data and method of study:

The population for this study consisted of 107 seventh grade students of which 80 students were randomly selected from the upper and lower 40% of the I.Q. score range. The independent variables were 1) method of stimulus presentation, 2) mental ability levels, and 3) finger dexterity. The dependent variables were performance scores on a psychomotor task and the amount of time needed to complete the psychomotor task. An electrical assembly task was selected for this investigation because it is commonly used in industrial arts courses.

The finger dexterity test scores were analyzed to ascertain the relationship between finger dexterity and the completed psychomotor task, and finger dexterity an and the amount of time needed to complete the task. The correlation coefficients for the abouve relationships were very low.

Findings and Conclusions:

In view of the finding of no difference among the mean performance scores for the completed psychomotor task for different methods of stimulus presentation, it can be concluded that no difference in the amount of interference should be anticipated between the combined channels of communication when the material presented in each channel is redundant. Educators can expect high mental ability students to assemble similar electical circuits more accurately than low mental ability students.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Clabaugh, Richard, Delmar
(Last name) (First name) (Middle name)

Exact Title THE ROLE PERCEPTION OF FACULTY MEMBERS IN POSTSECONDARY SCHOOLS OFFERING OCCUPATIONAL EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 190

Granted by Texas A&M University College Station, Texas
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine the role of faculty members in postsecondary schools offering occupational education from their expressions about selected opinions, beliefs, and attitudes. The information, which heretofore had not been collected, provided supportive data to the Wyoming State Department of Education for implementing a comprehensive occupational education program from kindergarten through the fourteenth year. The population included full-time and part-time faculty members at the seven community colleges and two technical institutes in Wyoming.

A data gathering instrument in the form of an opinionaire was constructed with the assistance of a five-member review panel. The instrument was edited and refined following a pilot study at a community college in Montana. The opinionaires were bulk-mailed to the institutions that were included in the survey where an accomplice distributed them to the respondents. Fifty-five per cent of the estimated potential number of respondents returned the opinionaire that included an attached, self-addressed envelope.

Comparisons of role perception were made from the data received between (1) faculty members who taught occupational education and those who did not teach these courses, (2) faculty members of the various institutions included in the study, and (3) part-time and full-time faculty members. Other comparisons were made to determine if there were differences in the faculty members' perception of their role relative to their age, sex, years of teaching experience, and years in their present position.

Principal conclusions were:

1. Faculty members indicated meager understanding or agreement in the objectives and purposes of adult education.
2. The content of occupational education courses should be directed toward developing salable skills.
3. Public financial support for superior students should generally end upon completion of the secondary school.
4. Most faculty members request supplies and equipment for their educational value.
5. A well-informed faculty was deemed necessary for making effective policy changes.
6. Federal financial grants should be awarded with fewer restrictions as to the use of funds.
7. There seemed to be a degree of reluctance among faculty members to extend whole-hearted confidence in the younger generation.
8. Most faculty members avoid any form of student guidance beyond the traditionally limited areas of academics.
9. The most desirable attribute of a supervisor is reliable judgment.
10. The amount of authority that should be granted to a person occupying a supervisory position would be limited to making recommendations.
11. Faculty members did not wish to become involved in minimizing the costs of education to students.
12. Administrators should be excluded from membership in local faculty organizations.

Recommendations based on analysis of the data are as follows:

1. A survey should be conducted using the same instrument that would include administrators only, and the results could be compared with this study.
2. The responsibility for curriculums and finances for adult education should be firmly established.
3. A fair and equitable method for establishing college district boundary lines should be determined.
4. Effective teaching techniques, particularly in the laboratory, need further study.
5. The credit hour, required courses, and requirements for degrees among the various disciplines are in serious need of being up-dated.
6. Appropriate criteria that is acceptable for the determination of faculty salaries and salary schedules must be developed.

Order No. 72-5726, 190 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Clark (Last name), Francis (First name), Eugene (Middle name)

Exact Title EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE

Degree granted Ed.D., Date 1971 No. of pages in report 300

Granted by University of Missouri (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purposes of this study were: (1) to compare the cognition of students (differing in visual-haptic aptitude) exposed to two different learning treatments (a single learning hierarchy varying in the emphasis on visualization and prerequisite principles through written information); and (2) to ascertain the effect of the two learning treatments and the relationship of the three levels of visual-haptic aptitude to the number of trials (a function of the students' cognition) required to reach the criterion.

METHOD OF RESEARCH: This investigation was conducted as a six-group field experiment using a 3 x 2 factorial design with three levels of visual-haptic aptitude and two learning treatments. From the 116 sixth grade students enrolled at the Blue Ridge Elementary School, Columbia, Missouri, sixty were selected for the study.

The student's basic psychological orientation toward perception was thought to be an important factor in his ability to learn selected cognitive elements of orthographic projection. Therefore, *Successive Perception Test I* was selected as a measure of the student's visual-haptic aptitude.

The random assignment to treatments was conducted separately for each of the three aptitude levels. The sample consisted of two treatment groups each containing thirty students; ten visuals, ten indefinites, and ten haptics.

Frontal inclined plane problems were selected for the final task because: (1) they are usually encountered in a typical industrial arts situation; (2) the task involved concepts and principles that are basic to orthographic projection; and (3) a highly abstract task was desired so that the naive student would find it difficult to directly formulate the solution on the basis of immediate perceptual stimulus in contrast to conceptual stimulus.

A learning hierarchy was developed based upon an *a priori* psychological analysis using the method proposed by Gagné. Behavioral objectives were derived for each unit of prerequisite information identified.

The two experimental learning treatments differed only in the accompanying written information provided the students. All other variables such as the drawings, test items, response requirements, and the learning hierarchy were held constant. Learning Treatment P (prerequisite principles) emphasized the initial learning of the principles of orthographic projection (conceptual). Learning Treatment V (visualization) emphasized visualization as the vehicle to cognition (perceptual).

The written information for the two learning treatments was presented through the use of the IBM 2741 Communications Terminal Utilizing a branching program.

Two experimental measures were recorded by the computer for each student. The measures were cognition of the final task and trials (the total number of units required to reach the final task).

FINDINGS AND CONCLUSIONS: Students who received Learning Treatment P (prerequisite principles) scored significantly higher on cognition of the final task than did those who experienced Learning Treatment V (visualization). There were no significant differences for interaction or among aptitude levels. Therefore, it may be concluded that the greater mean level of cognition was brought about by the cumulative effects of the learning of relevant prerequisite cognitive skills (expressed in terms of concepts and principles), rather than by immediate perceptual responses called the expression of a judgment.

A significant difference on trials was found between the two learning treatments. Students in Learning Treatment P (prerequisite principles) required significantly fewer units to reach the final task than did students in Learning Treatment V (visualization). Again, there were no significant differences for interaction or among aptitude levels. Therefore, it may be concluded that the lower mean level of trial scores for the total learning hierarchy was brought about by better articulation from one unit of the learning hierarchy to the next and/or a more positive transfer in the conceptual framework.

Order No. 72-10,547, 300 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Coates (Last name), Sue (First name), Stringer (Middle name)

Exact Title COLLEGE LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS

Degree granted Ed.D., Date 1971 No. of pages in report 185

Granted by University of Missouri-Columbia (Name of institution) Columbia-Missouri (City. State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The primary purpose of the study was to ascertain the relative value of various elements of college retailing programs in the preparation of potential executives, as perceived by retail employment executives and by retail educators. In assition, the study sought to ascertain the degree of compatibility existing between the perceptions of thes two groups.

Source of data and method of study:

An information form contining 110 informational topics and functional competencies relating to college-level education in retailing for potential retail executive trainees was designed for gathering the date important in this study. Perceptions were received from 102 retail employment executives in stores, and from 80 retail educators in colleges and universityies. Data returned by respondents of both groups was examined and analyzed for its relative value within the respective groups, and data were compared through use of the chi square statistical method, based on the .05 level of confidence for statistical significance.

Findings and Conclusions:

1. Forty of the 110 items were rated essential by a majority of the executives, and all but five of the total number of items were perceived as essential or important by 50% of the executives on the four-choice scale.
2. Retail employment executives indicated agreement in the perceived value of over three-fourths of the investigated items, while the retail educators revealed agreement on only two-fifths of the items.
3. Employment executives place essential or important value on topics relating to buying, pricing, salesmanship, merchandise information, and financial analysis and interpretation, and on leadership and supervision.
4. Retail educators place essential or important value on information relating to trends in retailing, concepts and psychology of pricing, accounting methods, expense analysis and management, and competencies dealing with conducting customer surveys and market research supervision and leadership.
5. Considerable diversity existed between the two groups in a comparison of rank order and percentages of support of topics perceived as essential by the executives with perceptions of the educators for the same topics.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Crawford (Last name), Newton (First name), Edwin (Middle name)

Exact Title A STUDY OF THE GROWTH AND DEVELOPMENT OF FEDERALLY-ASSISTED ADULT VOCATIONAIEDUCATION IN THE PUBLIC SCHOOLS BETWEEN 1917 AND 1970

Degree grated Ed.D. , Date 1972 No. of pages in report

Granted by The George Washington University (Name of institution) Washington, D.C. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To idenify the major federal legislation which has been enacted in support of public schol adult vocational education in order to analyze the federal governments role in the growth and development of these programs. A secondary purpose was to highlight some of the political, economic, and social forces which have influenced the inception, growth, and development of adult vocational education.

Source of ata and method of study:

Findings ad Conclusions:

1. Th first significant effort to focus national attention on the need to provide pulic support for vocational and industrial education in this country was brough about by the National Society for the Promotion of Industrial Education, formed in 906.
2. Th pattern by which the President and/or the Congress periodically turned to nationa advisory councils and commissions for advice and recommendations regarding federally-ssisted public vocational education dates back to 1914 and has continued to prove successful through the years.
3. Pulic vocational education personnel and programs made a significant, direct contributin to World War I and II production and adult training efforts.
4. Bth adult and total enrollments in vocational education programs showed relativelysteady increases over the period covered in this study, with the notable exception f some years during World War II and the Korean War, and during periods or economi depression.
5. Tcal adult vocational enrollment changes through the years since 1917 have, for the ovrall program effort in federally-assisted vocational education conducted in the pubic schools.
6. Adlt enrollments on the whole rose through the years, with the exception of 1970, a additional legislation was enacted or existing laws were modified to provide irreased federal support and program flexibility.
7. Th number of particpants in the individual occupational area of adult programs enerally followed the same patern shown by total adult vocational education nrollements for the period covered by the study.
8. Vaiances in individual adult occupational areas largeley reflect changes in programemphasis, funding authority, and socioeconomic conditions, as well as, the directand indirect effects of wars.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Croy, Jr., Elpyd Emerson
(Last name) (First name) (Middle name)

Exact Title KNOWLEDGE AND SKILL REQUIREMENTS OF MOTORCYCLE MECHANICS WITH IMPLICATIONS FOR COURSE DEVELOPMENT

Degree granted PH.D., Date 1972 No. of pages in report 216

Granted by Iowa State University, Ames, Iowa
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

The purpose of this study was to determine the need for motorsysle mechnaic training in Iowa and the skills and knowledge these individuals should possess. In addition it was felt the background information obtained would help those who might wish to initiate such training or study this industry further.

Source of data and method of study:

A quistionnaire survey was conducted involving 121 motorcycle dealerships and 240 motorcycle owners. During visits to twenty-four dealerships, questionnaires were filled out by thirty-six currently employed motorcycle mechanics, and shop service records were randomly selected to determine the kinds of work being performed A total of 974 individual repairs were identified from these records. Eight motorcycle manufacturers and four persons in industry leadership roles responded to a letter inviting discussion on the subject of motorcycle mechanic training.

Findings and Conclusions:

Analysis of the data revealed that in the next two years the dealers responding would hire 141 full-time motorcycle mechanics; nearly doubling the 148 the currently employ. They would also hire ninety-nine part-time workers in the next two years. Most dealers indicated they did not know where they would find qualified worker.

Of the motorcycle owners responding, 43.2% have already experienced a shortage of motorcycle mechanics. Half of the respondedts own motorcycles that are 1970 or newer; implying an increasing need for service in coming years.

Only 44% of the dealers were making a profit on their service shops. Half of the dealers employed parts and/or service managers and those who did were less likely to make a profit.

The only formal preparation the motorcycle mechanics surveyed had for their trade, was the two weekcompany service schools that had been atteded by one-third of them. Almost half had two years or less of experience in their trade.

On the basis of the study it was concluded that the motorcycle mechanic shortage will grow, probably limiting the growth of the industry in Iowa. Training of these workers at area vocational schools should be implemented as soom as possible. The shortage could be met to some extent by adult evening courses in motorcycle maintenance for owners. The dealers and their foremen could benefit from business principles and management workshops. The subject matter emphasis of existing full scale motorcycle mechanic training programs appears to be accurate.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Cunningham (Last name), Beryl (First name), M. (Middle name)

Exact Title MAINTENANCE OF WOOD SHOP EQUIPMENT

Degree granted Ed.D., Date 1952 No. of pages in report 495

Granted by Bradley University (Name of institution), Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to produce a practical textbook or handbook which will enable those who use wood shop equipment to analyze and solve their maintenance problems. Maintenance is interpreted to include the proper adjustment and care of tools and machines; periodical lubrication and reconditioning of equipment; sharpening of cutting edges; the replacement of tools and parts; the repair of worn parts; and the installation of new equipment.

The maintenance of wood shop equipment is discussed under such headings as (1) tools used for sharpening — grinders, grinding wheels, oilstones, and files; (2) maintaining the cutting edges of tools — sharpening operations; (3) hand planes — maintaining hand planes; (4) chisels and gouges; (5) cabinet scrapers; (6) hand saws — selection and care, hand saw maintenance tools, sharpening hand saws; (7) wood bits; (8) miscellaneous hand tools; (9) band saws — the machine, band saw blades; (10) circular saws — bench saws, radial saws, circular saw blades; (11) jig saws; (12) speed lathes; (13) jointers; (14) mortisers — the machine, mortising tools; (15) single surfacers; (16) sanding machines — belt sanders, disk sanders, coated abrasives used on sanding machines; (17) shapers — care and adjustment, shaper cutters; (18) electric motors; (19) V-belts; (20) lubrication of machines; (21) installation of equipment.

Under these headings, the principles of tool and machine care are clearly explained. Detailed informational units and procedures are given for each maintenance job. Illustrations and tables are provided for class use and self-instruction. The procedure sheets include the steps necessary for doing maintenance jobs that are common to the various classes of tools and machines instead of any one particular manufacturer's product.

Approximately three hundred highly rated manufacturers of woodworking equipment and related products were selected from the Thomas Register as the chief source for the research material needed for this study. These manufacturing concerns very generously supplied booklets, bulletins, catalogs, drawings, maintenance sheets, pamphlets and other data on the care and use of their particular products.

The bibliographies given at the end of the chapters include only the material supplied by manufacturers and by handbooks because it is supported better by research than by the information available from other sources.

Suitable material was not available for guiding the woodworker in performing some of the maintenance jobs. In these cases experimentation was employed to discover a satisfactory maintenance procedure.

Microfilm copy of complete manuscript of 495 pages, $6.19. Enlargements 6" x 8", 10¢ per page. Library of Congress card number Mic A53-834.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Danaher (Last name), Eugene (First name), I. (Middle name)

Exact Title THE FEDERAL TRAINING-WITHIN-INDUSTRY PROGRAM

Degree granted Ph.D., Date 1946 No. of pages in report

Granted by Stanford University (Name of institution) Stanford, California (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To assist defense industries to meet their manpower needs by training within industry each worker to make the fullest use of his best skill to the maximum of his individual ability.

Source of data and method of study:

The problem of increasing all types of skill was viewed by a special advisory committee appointed by the Division of Labor and Employment as embracing three broad aspects: (1) an inventory of present skills covering employed, unemployed, and employed workers operating below their maximum usefullness; (2) Training outside industry, including pre-employment and supplementary instruction, evaluated in terms of the need of and the facilities available for such instruction' and (3) training within industry, evaluated in terms of how great a responsibility for training industry could assume.

Findings and Conclusions:

The original plan of providing contractors with technical assistance on in-plant training problems was largely abandoned. T.W.I. decided to concentrate on the needs of supervisors and to help train supervisors to handle the increased problems of war production.

Job Instructor Training, the first training program to be devised, instructed the supervisor in "How to Instruct" a new man on a job or an old worker on a new job or skill.

Job Methods Training was designed to make supervisors critical toward their work, to assure the best use of manpower, machines, and materials, and to assist the supervisor in looking for improvements in methods by breaking down the job into its component parts.

Job Relations Training aimed at guiding new supervisors in securing proper relations between workers, the foremen, and the job. A special job relations program for union job stewards was also developed.

An appraisal is made of the applicability to noder industry of the residumm of training knowledge made available by T.W.I. practice. Such T.W.I. techniques as the management-contact approach, coaching, program evaluation, and follow-up procedures are considered.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Darm, Adam, Eugene
(Last name) (First name) (Middle name)

Exact Title GRADUATE APPRAISAL OF THE INDUSTRIAL TECHNOLOGY PROGRAM AT CALIFORNIA STATE COLLEGE, LONG BEACH

Degree granted Ed.D., Date 1971 No. of pages in report 212

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The Industrial Technology program at California State College, Long Beach was approximately ten years old at the time of this study. Though limited appraisals had been made, none has been as complete as this research. This research contains information of the graduates' personal and occupational profiles, along with an appraisal of each course required in his academic curriculum. Usage on the job and importance to the curriculum were determined by the graduates.

A questionnaire containing 57 questions was sent to all 496 graduates up to 1969. A 47 per cent return was obtained. A structured interview was used to gather data about the graduates from industrialists. The data were converted into percentages as a bases of determining the basis of effectiveness of the program.

The results showed 95.3 per cent of the industrial technologists came from junior colleges, 56.2 per cent were enrolled in technology programs at the two-year institutions, and 86.5 per cent earned Associate of Arts degrees. There was a general upgrading of job positions of students who worked while they were enrolled in the Industrial Technology program at California State College at Long Beach.

Thirty three companies hired the Construction graduates, 81 companies employed the Electronics graduates, and 44 companies employed the Manufacturing graduates. Most graduates were employed by aerospace, electronics, computer, and construction industries. They were engaged principally in positions of supervision of functions related to manufacturing, construction, and engineering.

Model curricula were developed for Construction, Electronics, and Manufacturing Options based on the graduates' estimates of each course's importance to their job and curriculum. Courses in the "indispensable" category were those which involved skills in industrial communications, problem solving, and in human motivation. Over 60 per cent of the graduates indicated the total curriculum as valuable in their occupational pursuits.

Order No. 72-5825, 212 pages.

SOURCE SHEET FOR ABSTRACTS OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Davis (Last name), Eddie (First name), Moore (Middle name)

Exact Title INDUSTRIAL ARTS FOR MENTALLY RETARDED STUDENTS IN JUNIOR AND SENIOR HIGH SCHOOLS OF MISSOURI

Degree granted Ed.D., Date 1971 No. of pages in report 204

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The purpose of this study was (1) to ascertain the criteria used in the content selection of industrial arts areas or courses for the mentally retarded student, and (2) to develop a guide to assist industrial arts teachers in the formulation or expansion of such programs.

Procedure

Questionnaires were sent to directors, supervisors, and teachers of industrial arts and special education personnel of the Missouri public school districts that had industrial arts programs for mentally retarded youth. One-hundred twenty-nine personnel participated in this study.

Conclusions

The following conclusions were drawn from the interpretation of the data:

1. Factors frequently used to designate the mentally retarded youth into industrial arts were chronological and mental age (48-78 I.Q. range), ability of student, interest of student, existing facilities, and teacher qualifications. Factors in selecting course content were ability of student, interest of student, mental age, existing facilities, length of activity, and teacher qualification. Industrial arts and special education supervisors share the responsibility of industrial arts programs for the mentally retarded youth.
2. Industrial arts class sizes recommended for the mentally retarded youth were: maximum not over 16, and a minimum or ideal of not over nine students per class. Mentally retarded youth share the same school and industrial arts facilities with the normal youth.
3. Educational objectives apply alike to the mentally retarded and normal youth. Techniques and methods of attaining objectives differed more with the mentally retarded youth. Industrial arts activities were suggested to be more occupationally oriented for the mentally retarded youth.
4. Factors considered in selecting industrial arts course content for mentally retarded youth were safety-health instruction, manipulative skills, occupational information, variety of practical experiences, application to home use, personal and social development, attitude-habit development, occupational training, leisure time activities, exploratory experiences, consumer information, and the integration of subjects with industrial arts.
5. Junior high industrial arts programs offered Arts and Crafts, General Shop, Unit Wood, Unit Metal, and Drafting, with Home Mechanics as a suggested additional area. Senior high programs offered Unit Wood, General Shop, Unit Metal, Cooperative Work Programs, and Arts and Crafts, with Home Mechanics and Occupational Information Classes suggested as additional areas.

Recommendations

1. Industrial arts and special education supervisors should share the responsibility of developing industrial arts programs that will meet the needs, interests, and capabilities of the mentally retarded youth. Consideration should be given to class size, and hours per day or week, and the special needs of segregated grouping.
2. Differences in attaining educational objectives with mentally retarded youth should include: simplifying term definitions, use of dimensions, processes, and procedures; planning success into learning and manipulative activities; and becoming acquainted with each student.
3. Factors to be considered in the designation of mentally retarded students into industrial arts programs and the selection of course content should be done in accordance with Conclusions numbers one and four respectively.
4. Industrial type activities for the junior and senior high school programs should be in accordance with Conclusion number five.
5. Occupational orientation should be given more consideration with the mentally retarded youth.

Order No. 72-13,309, 204 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author DeBord (Last name), Robert (First name), F. (Middle name)

Exact Title THE ROLE OF THE VOCATIONAL COUNSELOR IN COLORADO COMMUNITY COLLEGES

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution), Fort Collins, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To describe and anlyze expectations of the members of the counseling staffs within the community junior colleges relative to the role of the vocational counselor, to compare the functional activities of the vocational counselor position with ideal vocational counseling activities as described by the vocational counselor, and to analyze the philosophical career orientation of the counseling personnel within the community junior colleges.

Source of data and method of study:

Three basic types of data were collected: (1) baseline data, describing the general characteristics of the counselor being interviewed and some of the characteristics of his particular counseling situation: (2) counseling activities, which described the breakdown of time expenditures by the vocational counselor as compared with the time expenditures by activity which would occur in an ideal vocational counseling setting; and (3) the extent of agreement with career development philosophies of leading theorists in the field.

Findings and Conclusions:

The statistical analysis revealed that a majority of the counseling personnel was not satisfied with the vocational counseling program as it is currently being conducted. However, the variation of opinions among the counseling personnel did not provide conclusive evidence that there are significant differences in the perceived ideal vocational counseling activities.

Responses to the career development theories revealed no agreement among the vocational counselors and the nonvocational counselors. An analysis of each of the general theories likewise revealed no agreement in any one of the categories.

SOURCE BOOK FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Delzar (Last name), Christian (First name), Lincoln (Middle name)

Exact Title CREDENTIALING TECHNICAL TEACHERS

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine the work experience and education that should be required for credentialing technical teachers and teachers of related/applied subjects in technical programs, and if there were significant differences among technical teachers and administrators, based on their expressed opinions, relative to the work experience and education that should be required for various teaching credentials.

Source of data and method of study:

An instrument was developed and mailed to 20 per cent (300) of the full-time technical teachers and administrators having direct responsibility for technical education. Stratified random sampling was used in selecting entended respondents from directories provided by five randomly selected states. The mailings yielded a return from 271 (90 per cent) of the intended respondents. The responses on 244 of the returns (90 per cent of the returns) were included in the findings. Only the responses from full-time technical teachers and administrators were used in making the cross-tabulations. From this data, the analysis of variance test of significance was used for the statistical analysis.

Findings and Conclusions:

1. Technical teachers should have three to five years of work experience.
2. Related/ applied teachers should have two to three years of work experience.
3. High school technical teachers should have two years of post-secondary education , with an additional year for post-secondary teachers;
4. In excess of two years of post-secondary education should be required for teaching related/applied subjects in high schools, with an additionsl year for teaching post-secondary related/applied subjects.
5. Provisional credentialing requirements should include seven semester hours of pre-service vocational teacher education, and 12 semester hours of vocational teacher education should be required for standard credentials.
6. In general, professional growth should lead to a baccalaureate degree and additional work experience should be required during a teaching career.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Dempsey (Last name), Don (First name), Graham (Middle name)

Exact Title ACADEMIC ACHIEVEMENT AND COURSE SATISFACTION: A TEST OF HOLLAND"S THEORY OF VOCATIONAL CHOICE.

Degree granted Ph.D., Date 1972 No. of pages in report _____

Granted by University of North Carolina-Chapel Hill (Name of institution) Chapel Hill, North Carolina (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

The purpose of this study was to test the effectiveness of the congruence-incongruence dimension of Holland's Theory of Vocational Choice in predicting studnets' academic achievement and cours satisfaction.

Source of data and method of study:

The subjects were freshmen and faculty members at St. Andrews Presbyterian College, Laurinburg, N.C., in 1970-71. Holland's instrument, the Vocational Preference Inventory, was used to assess the personality types of students and faculty members. The Henmon-Nelson Tests of Mental Ability was used to measure the intelligence level of the students. The investigator's instrument, The Course Satisfaction Opinionnaire, was used to measure student course satifaction.

Findings and Conclusions:

The findings of this study indicated moderate support for Holland's theory in the area of academic achievement within the intellectual environment, but not within the artistic environmnt. Within the area of course satisfaction, directional support was indicated for the intellectual environment, but not for the artistic. The artistic environmental definition was suspected to be inaccurate in this study.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Detrick (Last name), Ronald (First name), Lee (Middle name)

Exact Title YOUTH EMPLOYMENT AND INDUSTRY/EDUCATION COOPERATION IN THE GREATER LONG BEACH LABOR MARKET

Degree granted Ed.D., Date 1972 No. of pages in report 198

Granted by University of California, Los Angeles (Name of institution), Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine the extent to which local employers, previously uninvolved in school district programs, were willing to work cooperatively with public secondary schools in a joint effort to better prepare youth to enter the world of work. By establishing the interrelationships between educational practices and youth employment policies, it was assumed that secondary vocational education could be restructured to function more effectively.

In researching the uncertainties of industry/education cooperation, eighteen hypotheses were developed and tested. Each hypothesis was designed to focus on a particular problem associated with the guidance, training, or job placement of youth. The degree of employer willingness to cooperate in each of a variety of vocational education activities was measured by a predetermined scale.

A total of 124 selected employers participated in the study, representing a wide range of company sizes and Standard Industrial Classifications. All employers were surveyed by use of an extensive questionnaire. The survey instrument consisted of four parts and supplied comprehensive data related to (1) Basic Information, (2) Youth Employment, (3) Employment of Persons with Special Needs, and (4) School-Employer Relationships. In-depth, postsurvey interviews were conducted with 75 of the 124 employer respondents.

The findings of the study revealed that employers generally were either unwilling or only moderately willing (1) to use high school placement services; (2) to check school references and recommendations; (3) to hire inexperienced youth; (4) to train and hire disadvantaged and handicapped persons; and (5) to cooperate with public schools in vocational guidance activities. Although positive responses were recorded in some instances, the composite results indicated a serious need for improved industry/education cooperation.

Based on the findings of this study, it was concluded (1) that high school placement services should be initiated or expanded, (2) that educational information should be more effectively communicated to prospective employers, (3) that educators should systematically improve all phases of youth training and placement, and (4) that employers should assume a more active role in the preparation of youth for productive citizenry.

Educators and employers must work together to effect the transition from school to work. School personnel must (1) work with both labor and management in program planning and implementation; (2) undertake essential research and development activities; (3) establish or expand job placement activities, including work experience education and cooperative education; (4) coordinate more effectively with State and Federal manpower and training agencies; (5) increase flexibility in program scheduling; (6) improve training and placement activities for disadvantaged and handicapped youth; (7) promote vocational education more effectively; and (8) adopt a comprehensive career education program. Employers must be totally involved in many phases of youth preparation if vocational education is to achieve lasting success.

Order No. 72-20,433, 198 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Detwiler, Sr. (Last name), Wayne (First name), Leon (Middle name)

Exact Title THE EFFECTS OF DEMONSTRATION TEACHING AND PRACTICE TEACHING ON THE COGNITIVE BEHAVIOR OF VOCATIONAL INDUSTRIAL EDUCATION STUDENTS.

Degree granted Ed.D., Date 1971 No. of pages in report 118

Granted by Pennsylvania State University (Name of institution), University Park, Pennsylvania (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem was to investigate the effects of demonstration teaching and practice teaching experiences on the cognitive behavior of vocational industrial education student teachers. The problem included consideration of the change in cognitive behavior of vocational industrial education student teachers as a result of either the demonstration teaching treatment or the practice teaching treatment, the geographic location of the treatment, the influence of different university supervisors, and the influence of different supervising teachers. Affective behavior of the participants in the form of student attitudes toward the course treatment to which they were assigned was considered as a segment of the problem.

A review of the literature revealed a list of teaching practices and techniques which are relevant to the instructional process. This list was distributed to a jury of nine experts for acceptance or rejection and categorization. Ten general categories of teaching practices and techniques were identified and used to develop a 10-item essay instrument designed to gather data on the cognitive behavior of the participants involved in this study. Additional steps which were taken to insure improved objectivity and reliability of the essay instrument included the development of a well-defined scoring key; pooled rating of the instrument by three unbiased judges; scoring the answers of all respondents to a single item before stopping or proceeding to the next item; anonymity of respondents; and control for the wording of responses and other grammatical concerns.

The 10-item essay instrument was administered as a pretest to 57 participants and as a posttest to 51 participants. Test scores were assigned by each of three raters and a composite test score for each participant was established. Internal consistency reliability coefficients, inter-item correlations, and inter-rater correlations were calculated using this data. Statistical analysis of the 10-item essay instrument indicated that the instrument was appropriate to measure the change in cognitive behavior of the demonstration and practice teaching treatment groups. A single factor analysis of covariance was used to determine if differences existed between the adjusted posttest scores achieved by the participants assigned to the demonstration and practice teaching groups.

A course attitude questionnaire developed with copyright by the Division of Instructional Services at The Pennsylvania State University was used to gather data on the affective behavior of participants in this study. Mean course attitude questionnaire scores were established for five subgroups as well as for the two main treatment groups. An analysis of variance was used to determine differences in attitude of the subgroups toward the treatment to which they were assigned while a t-test was used to test the significance between the means of the two main treatment groups.

The following conclusions are drawn from the findings in this study:

1. The location of the demonstration teaching treatment, the influence of different university supervisors, and the location of the practice teaching treatment did not have any significant effect on the change in cognitive behavior of the participants in this study.

2. A difference significant at the .01 level was observed between the demonstration teaching group and the practice teaching group and was attributed to the treatment to which the participants were assigned. The demonstration teaching treatment was better than the practice teaching treatment in accomplishing a positive change in the cognitive behavior of student teachers in vocational industrial and technical education.

3. Although the demonstration teaching treatment group reacted more favorably toward each of the six factors considered in the course attitude questionnaire than did the practice teaching treatment group, no significant difference in affective behavior between the two groups was noted. Therefore, the attitude of the student teachers toward the treatment to which they were assigned was not the cause of the significant difference recorded in cognitive behavior between treatment groups.

Order No. 72-9452, 118 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Devlin (Last name), Leon (First name), Gilbert (Middle name)

Exact Title AN ANALYSIS AND EVALUATION OF THE DOCTORAL DEGREE PROGRAM IN INDUSTRIAL EDUCATION AT TEXAS A&M UNIVERISTY

Degree granted Ed.D., Date 1971 No. of pages in report 402

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purposes of the research.—The primary objectives of this study were to provide a historical record, a predoctoral profile of the enrollees, a postdoctoral profile of the graduates, an evaluation, and recommendations for emphasis and expansion with respect to the doctoral program in Industrial Education at Texas A&M University.

Procedure of the research.—The research was designed to collect data from the graduates, the active graduate students, and the inactive students of the Industrial Education Department at Texas A&M University. Data gathering instruments were developed utilizing the outlined objectives and mailed to the 163 persons identified as the population. There were 143 returns from the population—a return of 87.7 per cent. Interviews were conducted with the 2 former department heads and the present department head to provide information relating to the history of the program.

Findings of the research.—The doctoral program was established in 1961 and there have been 78 graduates since the first degrees were awarded in 1963. The applicants came largely from families in which the father's educational attainments are elementary education, the mothers are high school graduates, and skilled workers are the predominate occupations of the fathers. Most new students came to the program from college or university positions with a majority having public school and industrial experience. The average enrollee is 32 years old, married, and the father of 2 children. The amount of financial assistance available was the primary factor in selecting the institution.

The responding graduates are employed in educationally related occupations in 27 different states. Almost 80 per cent are teachers, while 15 per cent are administrators, and 2 individuals are practitioners. Over 80 per cent of the graduates have published; 53.4 per cent of the published papers were technical in nature.

The committee chairman's assistance with the degree plan was described as accepting the program proposed by the student; while, slightly more than one-third indicated that the chairman limited his help on the dissertation to wise and necessary revisions. The oral comprehensive examination was an enjoyable experience for most. Most respondents selected their own dissertation topic and described the research experience as exciting, enlightening, and intellectual.

The average number of years required to complete the degree was 3.7, which was described as reasonable by most of the graduates. Nearly 50 per cent of the graduates' dissertations have been experimental; while, almost one-third were of a descriptive nature.

The factors described as most influential by the inactive students in making the decision to discontinue doctoral study were "no longer felt personal satisfaction in earning the doctorate" and "received the position desired."

"If all of the credits earned in the past were applied toward the degree," was the one factor which would cause most of the inactive students to consider returning.

The faculty evaluation yielded neutral results in most cases and most courses were described as being moderate in value to subsequent professional duties. The dissertation defense was described as a real defense of the research. Association with other doctoral students was the most valuable experience associated with the program and the program was described as generally relevant to later professional assignments.

A little more than 80 per cent indicated they would pursue the doctorate again, but over 60 per cent would prefer to work under less anxiety. Almost 50 per cent would take the same program and over 75 per cent would again study at Texas A&M. Most of the graduates are satisfied with the degree. The description which best depicted the doctoral program was: "flexible, allowed interdisciplinary studies."

The entire academic record was suggested as the most important factor to consider when considering an applicant's credentials. The selection of the major professor should be a mutual choice and the degree program should be planned jointly by the chairman and the student. A little more than half of the respondents recommended that the selection of the dissertation topic be a joint venture between the chairman and the student. More than three-fourths of the respondents indicated that the program should allow more specialization in teaching, research, and administration in the fields of industrial arts, vocational industrial education, and technical education.

For success in a doctoral program it was recommended that an applicant have a strong personal motivation and a desire to make a contribution to the field. It was also suggested that an applicant have good physical, social, and psychological adjustment.

Order No. 72-5727, 402 pages.

SCHOOL STUDENT AND SCHOOL RELATED CONCERNS IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Dittenhafer (Last name), Clarence (First name), A. (Middle name)

Exact Title A COMPARISON OF TWELFTH GRADE COLLEGE PREPARATORY AND VOCATIONAL TECHNICAL STUDENTS" PERSONALITY NEEDS AND ENVIRONMENTAL PRESS AS A FUNCTION OF PROGRAM SEPARATION

Degree granted Ed.D., Date 1972 No. of pages in report 160

Granted by Rutgers - The State University of New Jersey (Name of institution) New Brunswick, New Jersey (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The purpose of the study was to compare the perceptions of senior secondary students relative to personality needs, formal learning environmental characteristics, and the congruence or incongruence between the two.

Source of data and method of study:

The final sample consisted of 1,877 senior students. Two instruments AI and HSCI, were administered to all S_s in the study during April and May of 1971. The author administered the test instruments in all the school with the assistance of local guidance and/or administrative personnel. Spearman Rank Order correlations were computed on the rankings of scale means to estimate needs - press relationships.

Findings and Conclusions:

1. The AI first-order factors entitled, Audacity-Timidity, Intellectual Interests, Motivation, Applied Interests, and Expressiveness-Constraint were found to be significant at P .01 for the program variable.
2. The combined means for the significant factors revealed college preparatory students had higher scores on intellectual interests, motivation, and expressiveness-constraints, while vocational-technical students had higher mean scores on Audacity-Timidity and applied interests.
3. The DFA uncovered a significant discriminant function accounting for 99.97 percent of the explainable program variance.
4. The AI first-order factors entitled, Applied Interests and Closeness were significant across the degree of program separation variable.
5. The combined means on the Applied Interests factor decreased as the degree of program separation increased.
6. The perceived environmental press analysis revealed significant findings for program and degree of program separtation variables.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACVATE & NAITTE

Author Doucette (Last name), Russell (First name), J. (Middle name)

Exact Title AN INVENTORY OF STUDENT, FACULTY AND ADMINISTRATOR PERCEPTIONS OF VARIOUS PHYSICAL ENVIRONMENTAL FACTORS AS AN AID IN PLANNING VOCATIONAL-TECHNICAL SCHOOL PLANTS

Degree granted Ed.D., Date 1972 No. of pages in report 265

Granted by University of Massachusetts (Name of institution), Amherst, Massachusetts (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem considered in this study was to procure some data upon the perceptions of the physical environment held by faculties and students in existing vocational facilities in the hope that this data might aid planners in the designing of efficient and pleasant vocational school plants.

In order to test the data sought by this study, seven hypotheses were developed as follows:

1. Students from the newer regional schools will view their schools more favorably than students from older vocational schools.
2. Faculty from the newer regional schools will view their schools more favorably than faculty from the older schools.
3. Faculty will respond more favorably than students in the various schools.
4. There will be little difference in degree of favorable attitudes among the five new schools.
5. There will be no significant difference in the favorability of responses between male and female students.
6. There will be no significant differences in favorability of responses among juniors, seniors and institute students.
7. There will be no significant differences in the favorability of responses between vocational and academic teachers.

A questionnaire was designed to seek the perceptions of the school's physical environment held by students and faculties. The questionnaire was administered to faculty and student samples in five new regional vocational-technical schools and to a similar sample in two much older vocational schools.

The research design employed in the study is the Control-Group Post-test only-Design. The experimental or X variable was the physical environment of a new school which was assumed to be a more optimal environment than could be provided by an older school. The dependent or Y variable was student and faculty attitudes toward the physical environment of their schools. Therefore the samples from the newer schools became the experimental group as they were already in the newer environment. The samples in the older schools became the control group.

To test the hypotheses the chi square technique was employed. The observed frequencies were tabulated for each comparison indicated in the hypothesis. Using kxl contingency tables the corresponding expected frequencies were calculated. In all comparisons significance was sought for all subscales appropriate to that comparison. The data revealed the following findings:

1. Students in the newer schools responded more favorably than students in older schools on all subscales according to the raw data, however the results failed to reach significance on two of the nine subscales.
2. Faculty in the newer schools responded more favorably on all subscales at the .05 level or above.
3. Teachers usually respond more positively than do students.
4. When students in each of the newer schools were compared, no significant differences were found.
5. Little difference was observed in the perceptions of male and female students.
6. On comparing juniors, seniors and institute students no conclusive pattern emerged.
7. There appeared to be no real difference in the perceptions of academic and vocational faculties.

The tested data indicated when better facilities were provided, faculty and students responded more favorably to their physical environment. It was also indicated when the various groups were broken down into subgroups little differences appeared in their responses.

The review of the facility literature, expert opinion canvassed and on site observations appeared to indicate much more attention should be paid to psychological factors in the designing of new facilities. Even more emphasis should be placed on the importance in considering the school house as a social setting for the building of a better society.

Order No. 72-22,026, 265 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author DOUGLASS, STEPHEN, A.
(Last name) (First name) (Middle name)

Exact Title Status of Non-Credit Adult Education in the Community Colleges in the North Central Accrediting Region

Degree granted _____, Date _____ No. of pages in report _____

Granted by Ohio State University Columbus, Ohio
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: The purpose of this studey was to ascertain the prevailing conditions, procedures, and practices of adult education in public community colleges and those considered to be important by Directors of Adult Education in the Community Colleges of the Northe Central Accrediting Region.

Source of data and method of study: Information forms were prepared and sent to the Directors of Adult Education in Community Colleges in the Northe Central Accreding to complete the information forms. An examination was designed for the purpose of obtaining information concerning the community colleges programs. The data collected in the study was reported and analysed to identify commonality of procedures, methods, and practices in the various community colleges.

Findings and Conclusions: 1. Metropolitan and Non-Metropolitan community Colleges offered adult non-credit education programs in avocational, cultural, vocational, public affairs, and adult basic courses. 2. A "certificate of attendance" was the primary form of recognition for adult non-credit courses. 3. Course offerings were determined by demand through use of surveys and requests. 4. A large per cent of the Non-Metropolitan Community Colleges did not use the "advisory committee". 5. Federal and state funds were used for most of the cost of adult basic courses. 6. The data revealed that teachers of adult non-credit programs in the community colleges surveyed were predominately "college personnel", "high school teachers", or "professional people other than teachers". 7. Twenty-nine percent of other educational agencies presenting similar programs in the community were local high schools, and the local extension office accounted for 25 per cent. 8.The results of the survey indicated that Directors of Adult Education will look for characteristics other than education as a first priority when considering teachers for adult non-credit programs.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Drake (Last name), James (First name), Bob (Middle name)

Exact Title A STUDY OF THE ATTITUDES OF ADMINISTRATORS, COUNSELORS, FACULTY MEMBERS, AND STUDENTS TOWARD VOCATIONAL EDUCATION IN THE STATE SUPPORTED VOCATIONAL-TECHNICAL INSTITUTES AND JUNIOR COLLEGES OF ALABAMA

Degree granted Ed.D., Date 1972 No. of pages in report 166

Granted by Auburn University (Name of institution) Auburn, Alabama (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine the attitudes toward vocational education, particularly at the post-secondary level, of administrators, counselors, faculty members, and students in the state-supported two-year post-secondary educational institutions of Alabama.

Source of data and method of study:

The variables of (1) length of work experience in fields other than education, (2) race, and (3) type of institution were further analyzed to identify differences in attitudes toward vocational education by professional personnel.

Student variables analyzed to identify differences in attitudes toward vocational education were: (1) type of institution, (2) fathers' educational levels, (3) fathers' occupational classifications, (4) places of residence, (5) length of time enrolled in a high school vocational education program, and (6) race.

Findings and Conclusions:

1. Groups of administrators, counselors, faculty members, and students in post-secondary educational institutions differed significantly in their attitudes toward vocational education..
2. All groups in the vocational-technical institutes demonstrated significantly more favorable attitudes toward vocational education than their counterparts in the junior colleges.
3. Attitudes of professional personnel toward vocational education is apparently influenced by length of work experience in fields other than education they have.
4. Only in the vocational-technical institutes did professional personnel categorized as whites demonstrate significantly more favorable attitudes than do blacks.
5. Students' attitudes toward vocational education appeared not to be influenced by students' fathers' educational levels or fathers' occupational classifications.
6. Student attitude was reflected in the length of time one was enrolled in a high school vocational educastion program.
7. White students demonstrated significantly more favorable attitudes toward vocational education than did black students.
8. All groups in the post-secondary institutions of Alabama expressed favorable attitudes toward vocational education and any differences that existed appeared to be in degree of positive attitude.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Dye (Last name), Charles (First name), Myron (Middle name)

Exact Title CALVIN MILTON WOODWARD, A LEADER OF THE MANUAL TRAINING MOVEMENT IN AMERICAN EDUCATION

Degree granted Ph.D., Date 1971 No. of pages in report 395

Granted by Washington University (Name of institution), St. Louis, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

In the decades after the Civil War, the United States changed from a rural-agrarian America to an urban-industrialized society. This fundamental shift forced change in all institutions. Education was dramatically affected, because a technological society is dependent on the institutions of education for its very existence and its capacity to progress.

An early response to the needs of the postwar "new America" was the emergence of the manual training movement. This study will investigate the work of a vigorous proponent of the manual training idea, Calvin Milton Woodward of Washington University, St. Louis. Widely referred to as the "father of manual training", Woodward initiated the idea that manual training was the appropriate innovation for secondary schools in America, and that it should become part of the general education of every boy. Woodward maintained that each boy could be prepared simultaneously through the manual training curriculum, composed of tool instruction and an abbreviated academic course, for entrance into the higher technical schools or the world of work.

Woodward's establishment of the Manual Training School at Washington University in 1879 provided the "pioneer school". The spread of manual training schools and departments over the next quarter-century was largely due to Woodward's promotional campaigns.

The phenomenon of the manual training movement and the work of Woodward has remained relatively untouched as a subject for investigation. This study operates from the assumption that new educational programs do not occur by chance. In learning how demands for educational innovations occur and by what methods they are implemented in the curriculum, we gain insights about the nature of American education and its relation to the larger society. This study analyzes the work of Calvin Milton Woodward as he sponsored the manual training idea throughout his forty-five years with Washington University.

Utilizing the techniques of historical methodology, collections of the Washington University Archives were examined: Eliot Notebooks, Corporation Records, Chancellors' Files, Minutes of the Board of Managers of the Manual Training School, Catalogs of the Manual Training School, and the Files of the Manual Training School, along with several incomplete manuscripts on the history of the university. Reports and proceedings of the organizations of which Woodward was a member were studied: National Educational Association, St. Louis Board of Education, Society For the Promotion of Engineering Education, American Association For the Advancement of Science, and the North Central Association of Colleges and Secondary Schools. A Woodward Bibliography was compiled, as one did not exist previously. Educational journals of the period were examined, interpretative studies of the period were read, and documents of the U.S. Bureau of Education were studied.

This study investigates:

1. The influences of Woodward's family and father on his style of leadership, his youth, his educational preparation, and his early career as a secondary administrator and teacher.
2. Woodward's attraction to Washington University, its polytechnic emphasis, and its innovative leadership.
3. Woodward's emergence as a leader in American engineering education, the establishment of the Polytechnic School of Washington University.
4. The development of Woodward's manual training idea and the establishment of the Manual Training School of Washington University.
5. The Manual Training School course of study, the school's backers, Woodward's autonomous control, and the school's graduates.
6. Woodward's national campaign to promote manual training in the National Educational Association, his techniques, the spread of manual training in the United States and England, the Woodward-Harris debate, his promotion in other professional societies.
7. Woodward's campaign for manual training in the St. Louis Public Schools.
8. Challenges to Woodward's control at Washington University and the Manual Training School.

Order No. 72-9327, 395 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Dyer (Last name), Palmer (First name), Edwin (Middle name)

Exact Title A STUDY TO IDENTIFY THE ROLE OF THE MEDIA TECHNICIAN IN EDUCATION

Degree granted Ed.D., Date 1970 No. of pages in report 131

Granted by Temple University, (Name of institution) Philadelphia, Pennsylvania (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The rapid advance of scientific and technological developments has led to large-scale shortages of skilled, trained professional and technical personnel in all fields of endeavor. The multiplicity of newer teaching and learning materials has generated a need for trained media personnel in schools. There is a need to identify the roles and responsibilities of media personnel at all levels of education.

The purpose of this investigation was to identify the role or roles of the non-professional media personnel in education.

The following questions were answered in the research conducted for this study:

1. What are the various roles media technicians may be required to assume?
2. What task responsibilities are to be assumed under various role classifications?
3. Where would specialized training best be acquired for various media technicians?
4. What positions would the media technician occupy on a staff/line organizational chart?

The procedures employed to collect data pertinent to this study included the following:

1. A review of the available literature related to the field of educational media and media personnel.
2. A survey of current practices related to the employment and training of non-professional media personnel by reviewing literature in which roles or task responsibilities of media technicians were described; by conducting personal interviews with media technicians currently employed in educational institutions; and by reviewing programs of two-year institutions of higher education designed to train media technicians.
3. A tabulation of responses to a questionnaire devised by the investigator with the assistance of his advisory committee. Part I of the questionnaire was developed to determine which tasks specified under a major role classification were to be assumed by the media technician functioning in that role. Part II was developed to determine where specialized training would best be acquired for the media technician in a specific role classification. Part III was developed to answer questions regarding specific characteristics of the media technician's staff position.

The questionnaire was submitted to: (1) Recognized authorities in the educational media field, (2) state directors of educational media programs, (3) selected two-year institutions of higher education, and (4) selected educators in the educational media field.

The data resulting from this study indicate that the multiplicity of tasks currently being performed by media technicians could be grouped into specific major role classifications. The actual division of role responsibility or task differentiation is dependent on the size and sophistication of the media program.

The vocational-technical high schools and the junior or community colleges of the United States should assume leadership roles in developing programs designed to train media technicians for employment at all levels of education.

The media technician is not a professional educator; therefore, the task responsibilities assumed by him should be limited to the duties of technical or production assistance to professional educators.

Order No. 71-10,847, 131 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Easton (Last name), Clifford (First name), W. (Middle name)

Exact Title THE EFFECT OF THE STRUCTURE AND EMPHASIS OF GROUP TRAINING METHODS ON COMMUNICATION SKILLS ATTITUDE CHANGE AND PROBLEM-SOLVING ABILITY

Degree granted Ed.D., Date 1971 No. of pages in report 130

Granted by Rutgers, The State University of New Jersey (Name of institution) New Brunswick, New Jersey (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To answer the following questions: Will any of three different training methods, each with different participants extending over a five-day period, result in a significant improvement in communication skills, attitudes, and problem-solving ability?

Source of data and method of study:

The instrument used to gather data on communications and attitudes was the Institute Adjective Scale, a form of the semantic differential test. The Watson-Glaser Critical Thinking Appraisal was used to measure changes among participants on problemsolving ablity.

There were 113 participants in attendance in three treatment groups. Each group may be numberically broken down to include: 33 in T.L. I, 30 in T.L. II, and 50 in T.L. III. The age range for each group fell between 24 and 65. This range was determined by the examiner after extensive verbal interaction with participants at each of the training programs.

Findings and Conclusions:

1. The treatment levels did not differentially affect communications.
2. A) The treatment levels did not differentially affect attitudes toward the concept group, race, at a significant level.

B) Treatment level I produced a significantly greater positive change of attitude toward the concept group, vocational education, than other treatment levels.

C) Treatment levelIII produced a significantly greater positive change or attitude toward the concept group, this institute, than the other treatment levels.

3. Treatment level I produced the greatest positive change in problem-solving ability with treatment level III second and treatment level II third.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Edsall (Last name), Alan (First name), R. (Middle name)

Exact Title _____

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine if attending an orientation workshop would affedt the adjustment toward teachin of the beginning trade and industrial teachers in Colorado for the 1971-72 school year.

Source of data and method of study

The procedure utilized to evaluate this adjustment was to analyze the supervisory evaluation form used by the Trade and Industrial Division, the State Board for Community Colleges and Occupational Education, Denver, Colorado.

Participants of the study were the beginning trade and industrial teachers in Colorado for the 1971-72 school year. The twenty-six teachers in this study were from nineteen educational settings. They represented local high schools, comprehensive high schools, area vocational schools, community colleges, and the state training school.

Findings and Conclusions:

1. The analysis of the groups showed that the areas of significant differenée were: Shop organization; student records; instructional materials; housekeeping; advisory committees; shop facilities.

2. No significan difference occurred in the following areas: safety practices; enrollments; youth organizations; student participation;

3. No significant difference in adjustment toward teaching was found as a result of the influence of the following variables: age; class size; education; enrollment; millitary service; previous teaching experience; vocational director; years of occupational experience.

4. No significant difference in individual perceptions of the role of the teacher among the experienced trade and industrial teachers, the beginning trade and industrial teachers, and the trade and industrial teacher education staff was found.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Edwards (Last name), Leonard (First name), Dean (Middle name)

Exact Title AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES

Degree granted Ed.D., Date 1971 No. of pages in report 155

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The major purpose of this study was to evaluate the importance of the basic elements of the courses taught in the industrial arts teacher education program at Black Hills State College. Another purpose was to obtain status data of those who graduated with a major in industrial arts during the years 1960-1969. More specifically, answers were sought for the following questions: (1) geographic location of graduates; (2) occupational status of graduates; (3) nature and amount of additional training pursued by the graduates; (4) graduates' perceived advantages of a career in industrial arts and preparation for this at Black Hills State College; (5) the importance of the basic elements of the various courses to the graduates in their present position; (6) adequacy of basic subject areas of industrial arts; and, (7) suggestions for improving the industrial arts program at Black Hills State College.

METHOD OF RESEARCH: Names and addresses of the 86 graduates who majored in industrial arts from 1960 through 1969, were obtained from the official records in the Registrar's Office at Black Hills State College. An information form, developed by the investigator, was sent to each graduate. A total of 79, or 92 per cent, of the information forms were returned, which formed the data base for this study.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS: The majority of the graduates resided outside of South Dakota and it was concluded that this pattern of employment will continue unless there are changes in the supply of and demand for industrial arts teachers.

Since 75 per cent of the respondents were employed in the field of education and very few had changed occupations, it was concluded that future graduates will be employed primarily in the field of education unless there is a change in the labor supply and demand.

Since almost one-half of the graduates had received an advanced degree or were pursuing an advanced degree, it was concluded that their experiences during their undergraduate work were compatible with continued education. However, since almost one-half of the graduates had taken additional specialized courses in the areas of electricity/electronics, professional, and metals, it was concluded that they were lacking adequate training in these areas and if more emphasis is not placed on these areas, future graduates will need additional specialized courses in these areas.

It was also concluded that the program is deficient in terms of facility, equipment, and program of offerings, and that more emphasis should be placed on modern industrial processes in all areas.

Based on the indicated inadequacies, the graduates' suggestions for improving the industrial arts program, and the number of graduates who had taken additional specialized courses, it was concluded that the areas of drafting, woodworking, and plastics are satisfactory. However, the areas of ceramics, electricity/electronics, graphic arts, metals, power and transportation, and textiles are inadequate. It was recommended that these areas be represented, expanded, and improved in the industrial arts program and be offered on as broad a basis as possible.

It was concluded that in performing the duties of their present positions the graduates place most importance on the basic elements of the professional area followed by electricity/electronics, drafting, woodworking, crafts, and metals.

The perceived advantage of a career in industrial arts by the graduates was that the content is based on human needs, such as, to create, explore, manipulate, excel, and beautify; and the advantages of attending Black Hills State College to prepare for this career were primarily geographic location and quality of education.

Order No. 72-10,549, 155 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Eggers, Jerry, Richard
(Last name) (First name) (Middle name)

Exact Title THE DEVELOPMENT AND EVALUATION OF A PROPOSED INDUSTRIAL-TECHNICAL CLASSROOM PUBLICATION

Degree granted Ed.E., Date 1970 No. of pages in report 147

Granted by Texas A&M University, College Station, Texas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem with which this study dealt was the development and evaluation of a prototype issue of a proposed industrial-technical periodical intended for classroom use in industrial arts. It was hypothesized that such a periodical could contribute significantly to creating a better understanding of the industrial and technical aspects of our society on the part of industrial arts students. It was anticipated that the development and evaluation of the prototype would provide a stimulus for thought and provide a basis for reaction to the concept of such a periodical.

The initial phase of the development of the prototype issue involved the decision to have the publication be primarily a digest of current articles from existing publications. After reviewing many technical, trade, and industrial journals, specialty magazines, and house organs, sixteen articles were selected as being most suitable for the prototype. Permission to condense and reprint the articles was requested from the various editors and organizations. Of the thirteen replies received, each editor offered full cooperation.

Tentative evaluation forms were developed after producing a "paste-up" version of the prototype, and completing a teacher's guide. After completing changes recommended by a jury, the prototype, teacher's guide, and evaluation instruments in their final form were sent to one hundred teacher educators selected at random from the American Council on Industrial Arts Teacher Education, and to fifty-eight ninth grade general shop teachers. Teachers who expressed a willingness to have their students participate, were provided with sufficient copies of the prototype and the evaluation form which was developed for students.

Seventy-five percent of the teacher educators and approximately eighty percent of the classroom teachers responded. Seven hundred and twenty-eight students participated. The evaluation of the prototype issue and the concept of a proposed periodical were based on the responses of the three groups—teacher educators, teachers, and students.

As a result of the evaluation information, the following general conclusions may be drawn with respect to the three participating groups:

1. A basic objective of ninth grade industrial arts is to relate industry and technology to the students.
2. Existing material to assist in meeting the objective is not adequate.
3. The prototype issue, being representative of a proposed periodical, and a teacher's guide could provide effective means for assisting teachers meet the objective.
4. The proposed publication could prove beneficial in improving public understanding of the nature of contemporary industrial arts, and help improve the relationship between industry and industrial arts.
5. All of the teachers and two-thirds of the students indicated a desire to use a periodical similar in nature to the prototype.
6. The concept of selecting and condensing articles from other publications was found to be acceptable by teachers and educators. The favorable response from publishers also supported the feasibility of such a concept.
7. Each issue of the proposed publication should provide generally comprehensive coverage of industry and technology.

It is recommended that a periodical be developed in accordance with the findings of the prototype development and evaluation. The publication development should be an evolutionary process based on a nationwide replication of this study. The professional support and financial backing of a particular firm, industry, or professional group would be indispensable to such a venture.

In addition, it is recommended that the feasibility of including industrial-technical information in existing classroom publications (those used in subject areas other than industrial arts) should be investigated.

Order No. 71-8929, 147 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Epstein (Last name), Jack (First name), H. (Middle name)

Exact Title LINE MANAGERS' PERCEPTIONS AND EXPECTATIONS OF THE OPERATIONAL FUNCTIONS OF AN EMPLOYEE DEVELOPMENT SPECIALIST IN A FEDERAL GOVERNMENT RESEARCH AND DEVELOPMENT ORGANIZATION

Degree granted Ed.D., Date 1971 No. of pages in report

Granted by The George Washington University (Name of institution) Washington, D.C. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To explore civilian line managers' perceptions and expectations of the operational functions of an employee development specialist in a Federal Government research and development organization

Source of data and method of study:

The following hypotheses with respect to the EDS' operational functions were set forth to be tested by the study: 1) first-level managers' perceptions and expectations will focus on the learning specialist function, which includes instruction and designing in-house programs; 2) middle managers' perceptions and expectation will focus on the administrator function, which includes budgeting for, developing procedures for, and coordinating training; 3) civilian executives' perceptions and expectations will focus on the internal consultant function, which includes guiding, assisting, and working with management in solving problems through training.

Findings and Conclusions:

1. Specified hypotheses were not supported.
2. Managers perceived and expected that the EDS would limit his behavior as a learning specialist.
3. Managers perceived and expected that the EDS would function as an administrator of training.
4. Mangers perceived the EDS as doing very little as an internal consultant but expected him to devote most of his time to this role.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Erber (Last name), Elmer (First name), E. (Middle name)

Exact Title VALUES AND INDUSTRIAL ARTS EDUCATION

Degree granted Ed.D., Date 1954 No. of pages in report 96

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to construct a theoretical foundation upon which the industrial arts may build, enrich, and vitalize its values and meaning, and to interpret and analyze these values and the meaning of the industrial arts within the walls of this foundation. A theory of value is formulated in regard to the nature and locus of value which is based upon the conclusions of general value theory. The formulation of this theory is followed by critical consideration of the values, processes, and meaning of the industrial arts within the context of the formulated theory.

Critical consideration is given to creative expression and its valuative structure – to its essence, structure, and attainment; to its implications and functional operation in the industrial arts, and to its dynamic potentiality for the creation and critical examination of value within the industrial arts.

A critical analysis is given to value and the aesthetics – to the emergence, the nature, and to the realization of the aesthetic experience in the industrial arts; to the aesthetic experience as a dynamic value created within the valuative structure of creativity in the industrial arts; to appreciation, and to intelligent receptivity in the development and realization of appreciation of beauty, good craftsmanship, and design in the industrial arts.

Critical thought is given to the meaning of the industrial arts within the valuative structure of creativity – to the meaning of art, to the meaning of the industrial, fine, utilitarian, and aesthetic elements in art, to their import in the evolution of value, and to the industrial arts as a phase of the whole gamut of art.

Critical discourse is given concerning the rich potentiality possessed by the industrial arts for the creation of arts' therapeutic value, and the realization of this potentiality within the creative framework of the industrial arts.

The study is concluded with basic summations, interpretations, and conclusions concerning value, the meaning and function of art and industry in the creation of value in the industrial arts, and the values created in the industrial arts as supported by the study. 96 pages. $1.20. MicA54-1736

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACTATE & NAITTE

Author Ethirveerasingam, Nagalingam ,
(Last name) (First name) (Middle name)

Exact Title THE EFFECT OF ADVANCE PRESENTATION OF ORGANIZERS ON COMPLEX VERBAL LEARNING AND RETENTION BY VOCATIONAL AGRICULTURE STUDENTS IN NEW YORK STATE.

Degree granted Ph.D., Date 1971 No. of pages in report 90

Granted by Cornell University Ithaca, New York
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

The purpose of this investigation was to compare the effect of organizers to that of overview and summary in learning and retaining complex verbal material.

Source of data and method of study:

182 students enrolled in the Farm Production and Management courses in the secondary schools in New York State were the subjects. The population was limited to the students in the eleventh grade. The subjects were randomly assigned to eight experimental groups of a factorial design resulting from the comparison of two levels of retention, two and nine days after treatment, and four levels of treatment. The material to be learned was a 2500-word passage on the structure and growth of the corn plant. The three organizers used were illustrated descriptions of the process of photosynthesis, the plant food cycle, and the reproductive cycle.

The criterion test used consisted of 28 multiple choice items to measure knowledge--the lowest category in Bloom's Taxonomy of Educational Objectives.

Findings and Conclusions:

An analysis of vaiance test revealed no significan differences betwee treatments. There were also no significant interactions between Retention and treatment. It was conluded that organizers and overview and summary, if at all they contribute to the learning and retention of complex verbal materials by the vocational agriculture students in New York State, they do so to the same extent.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Everett (Last name), George (First name), Allen (Middle name)

Exact Title THE LINOTYPE AND U.S. DAILY NEWSPAPER JOURNALISM IN THE 1890'S: ANALYSIS OF A RELATIONSHIP

Degree granted Ph.D., Date 1972 No. of pages in report 398

Granted by University of Iowa (Name of institution), Iowa City, Iowa (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine certain phases of the Linotype machine's impact on daily newspaper journalism in the United States during the 1890's. The problem was approached in two ways: by historical analysis, and by measurement of content in 26 selected newspapers before and after they installed the machines.

Sixty years of effort to automate typesetting were largely unsuccessful until the Linotype appeared in 1890. By then the daily press was expanding rapidly. The Linotype was introduced swiftly and on a broad front: the first machines were offered to the industry in 1890, and by 1895 2,545 Linotypes were in use in the United States, 2,309 of them by daily newspapers. By 1897 25% of the dailies in the nation, including practically all the large ones, were setting their body type with Linotypes.

In order to seek possible effects of the introduction of these machines upon newspaper content, 26 newspapers were selected for content analysis. The sample was nonrandom, being dependent upon the availability of newspaper microfilms and of the approximate date of Linotype installation at each newspaper. These newspapers were located in 26 cities which were well distributed geographically and ranged in size from Sioux Falls (population 12,146) to New York City (1.5 million). They all installed their first batteries of Linotypes between May, 1892, and July, 1895.

A list of typical-news dates was constructed which consisted of one date each from February, May, August and November in the years 1890-97. A transition period of two months before and four months after Linotype installation was allowed for each newspaper. From the list of dates, a sample of dates was constructed for each newspaper, consisting of the eight dates preceding and the eight dates following the transition period. Issues were measured for these dates, providing a two year sample of issues before Linotype installation and a two-year sample of issues before Linotype installation and a two-year sample after installation. Thus 16 issues were measured for each of 26 newspapers.

Issues before and after installation were compared for each newspaper, on bases of size (in standardized column inches), percentage of advertising, percentage of credited clippings, and percentage of illustrations. Results for all newspapers as a group:

	Newspapers Before Lino	Newspapers After Lino	Difference	All-Issue Average
Size-Index*	13.5	15.4	+1.9	14.4
Advertising %	41.2%	36.4%	−4.8	38.8%
Clippings %	3.8%	3.4%	−0.4	3.6%
Illustration %	0.5%	0.9%	+0.4	0.7%

*Size-index represents hundreds of column inches per issue standardized to 13-pica-wide measure.

Also, same-date comparisons were made on those dates when some newspapers were measured which had Linotype machines and other papers were measured which did not have the machines. These comparisons tended to confirm the differences noted above.

From the results of the content analysis it was concluded that there was a relationship between the installation of Linotypes and (a) increase in newspaper size, and (b) decrease in percentage of advertising. Also noted, but considered inconclusive, were trends toward reduced use of clippings, and toward more rapid size growth through the post-installation period than through the pre-installation period.

By summing the measured content data with the historical analysis, four broader conjectures were drawn: The Linotype (a) tended to neutralize the effects of the 1893 depression on newspapers with the machines, (b) helped destandardize newspaper content, (c) cut composing costs sharply while bringing no great change in the per-hour rate of total composing room output, and (d) was not significantly more beneficial to evening than to morning papers.

The Linotype is best viewed as a permissive rather than causative factor, its greatness coming largely from its participation in great social and economic movements in America at that time.

Order No. 72-17,553, 398 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Eversoll, Robert, Irving
(Last name) (First name) (Middle name)

Exact Title THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS

Degree granted Ed.D., Date 1971 No. of pages in report 187

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to ascertain experimentally the effect of career information, with and without audio distraction, on the attitudes and knowledge of students whose interests are similar to or different than those persons who are successful in industrial arts teaching. Specifically, the study was designed to ascertain the: (1) effect of exposure of industrial arts teaching career information with and without audio distraction on the attitude and knowledge of students with high and low interest as measured by the Minnesota Vocational Interest Inventory, (2) influence of career information upon post-treatment behavior of students with varying levels of interest as measured by the Minnesota Vocational Interest Inventory, (3) segments of the presentations that stimulated the most interest toward industrial arts teaching.

METHOD OF RESEARCH: The investigation was conducted during the 1970-1971 academic year, employing 201 eleventh grade male students from six randomly selected public secondary schools within a 100 mile radius of Columbia, Missouri.

The data for students in the experimental and control groups were obtained with a pre-questionnaire and interest measure prior to the occupational presentations and a post-measure of attitude, post test of knowledge, and post-questionnaire following the presentations of information.

The two-way analysis of variance was used to test for significant differences between the mean scores on the attitude scale and test of knowledge for students in the experimental and control groups.

Data from the pre- and post-questionnaire were described by frequency, with the exception of the section in which students were asked to rank the topics of the program, which was analyzed with the coefficience of concordance.

FINDINGS AND CONCLUSIONS: Significant differences were found for attitude and knowledge between experimental and control groups. Therefore, it may be concluded that the slide-tape program is one method that can be used to alter attitudes and transmit knowledge of industrial arts teaching to students.

Significant differences were found between the two methods (Treatment A and B) for attitude and knowledge. Therefore, it may be concluded the information without the distractor was more effective in altering attitudes and transmitting knowledge to students.

No significant differences were found for attitude and knowledge between high and low interest levels of students exposed to the two treatments. Therefore, it may be concluded that the slide tape program without distraction is effective at both interest levels in altering attitudes and transmitting knowledge to students.

More students of both treatment groups in high and low interest levels after the presentations consulted individuals regarding careers. Therefore, it may be concluded the slide-tape program without the distractor stimulated more interest to seek career information.

Students in high and low interest levels of Group II after the presentations indicated more interest in industrial arts teaching. Therefore, it may be concluded the program without distraction stimulated more interest toward industrial arts teaching.

Students of both groups ranked two topics of the program as most interesting (1) extra-curricular activities (clubs, fairs, hobbies), and (2) college life on the university campus. Therefore, it may be concluded both topics could be included in slide-tape programs to stimulate student interest.

RECOMMENDATIONS: It is recommended that (1) the slide-tape program without distraction be used to present occupational information related to industrial arts teaching. (2) the topics (extra-curricular activities and college life) may be included in slide-tape programs. (3) occupational information be made available to students following program presentations. (4) colleges and universities offering a program in industrial arts teacher education distribute to secondary schools, slide-tape programs describing industrial arts teaching as a career.

Order No. 72-10,550, 187 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fahrlander, Daniel, D.
(Last name) (First name) (Middle name)

Exact Title THE ROLE OF THE TEACHER IN THE VOCATIONAL EDUCATION AND PRACTICAL ARTS LABORATORIES

Degree granted Ed.D., Date 1972 No. of pages in report 98

Granted by Utah State University Logan, Utah
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To develope and test an instrument that would assist an individual to record and analyse teacher behavior in the vocational education and practical arts laboratories.

Source of data and method of study: Observations were made in eleven northern Utah high schools. Teachers of selected vocational education and practical arts laboratories were observed for half-hour periods of time. An instrument was developed and tested that would accomodate the kinds of teacher activities that typified instruction in the laboratory setting.

Findings and Conclusions: Two specific hypotheses regarding teacher behavior in the laboratory were tested. In the first, teacher behavior was found to be significantly related to the number of activities that were student initiated.
From the result of the study, it was concluded that teacher behavior could be objectively described and that, more specifically, laboratory teacher behavior could be recorded and analyzed with the help of the instrument developed in this study.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fielding (Last name), Marvin (First name), R. (Middle name)

Exact Title DIRECTORS OF VOCATIONAL-TECHNICAL EDUCATION IN THE PUBLIC JUNIOR COLLEGES IN THE UNITED STATES

Degree granted Ed.D., Date 1966 No. of pages in report 147

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain the actual qualifications and duties of directors, to acertain the desirable qualification for directors, and to examine certain aspects of the organizational structure as they pertain to the administration of the vocational-technical program.

Source of data and method of study

All the public junior colleges in the United States listed in the 1966 Junior College Directory were invited to participate in the study which was limited to thos public junior colleges which had a director who devoted at least one-half his time to the administration of the vocational-technical program. Information forms and a cover letter were sent to the chief administrative official of each of the public junior colleges. Of the 479 institutions originally contacted, a total of 350., or 73 per cent, responded, and 235 directors were identified. Of these, 162 were directors wbo devoted at least one-half time to the direction of the vocational technical program.

Findings and Conclusions:

1. The number of directors of vocational-technical education in the public junior colleges will continue to increase.
2. Persons preparing for this position should acquire an appropriate occuational background, including work experience in business or industry, directly related to an area in the vocational-technical curriculum if possible.
3. An appropriate educational background for a director would include: an under-graduate major in either industrial education, engineering, or vocational-technical education; a graduate major in educational administration and supervision, industrial education, or vocational-technical education, with a concentration of graduate credit in vocational-technical education.
4. An appropriate professional background for a director would include: teaching experience on either the secondary or college level in one of the areas in the vocational-technical curriculum. Both administrative and teaching experience on the junior college level are desirable.
5. In terms of educational attainment, directors seemed to be well prepared for the positions they held; howeve, it would appear that some phases of their educational preparation had been inadequate.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Finley (Last name), Luther (First name), Eugene (Middle name)

Exact Title COMPUTING THE LINE OF POSITION IN CELESTIAL NAVIGATION

Degree granted Ed.D., Date 1954 No. of pages in report 191

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available Microfilm (X) Microfiche ( ) E.R.I.C. ( )

It was the purpose of this study to investigate the most nontechnical methods of solving the astronomical triangle, to investigate the mathematical methods of solving the astronomical triangle, and to devise a method as simplified as possible to locate the line of position with a minimum of equipment and on as nontechnical a basis as possible. The attempt to establish a better method for celestial navigation is covered by chapters devoted to (1) the problem, (2) a review of the literature, (3) a proposed new method, (4) latitude and longitude, (5) time, (6) celestial positions, (7) the line of position, (8) the use of "Table A", and (9) the use of "Table B".

The new method is summarized as follows. The latitude of the substellar point for celestial bodies is given in the Air Almanac, and the longitude can be determined from the Almanac. The navigator has determined his great circle distance from the substellar point by his sextant observation. The scale of the charts makes it impractical to construct a circle of equal altitude. The navigator uses his tables to determine different locations on the circle of equal altitude. By constructing a line through these established locations he has constructed a segment of the line of position for his locality.

In constructing the segment, the navigator first selects parallels of latitude on the meridian through the substellar position. He computes the angular distance between the circle of equal altitude and the meridian through the substellar position on a great circle perpendicular to the meridian through the substellar position at the selected parallels of latitude. This may be done by the proper use of "Table A". The logarithmic cosine function of the difference in latitude of the substellar position to the great circle perpendicular to the meridian, through the substellar position, is subtracted from the logarithmic cosine function of the observed distance of the zenith to the selected body as measured by the sextant. The remainder is the logarithmic cosine function of the distance on the great circle, perpendicular to the meridian through the substellar position at the selected latitude, between the circle of equal altitude and the meridian through the substellar position. The navigator finds the terrestrial coordinate point on his charts for the intersection of the circle of equal altitude with the great circle perpendicular to the meridian through the substellar position at the chosen latitude. This may be done by the proper use of "Table B".

"Table B" gives the latitude and longitudinal difference of the end of an arc on a great circle, for each minute of degree of angular distance of arc, when the great circle is perpendicular to any meridian of longitude with its vertex at any latitude.

191 pages. $2.39. MicA54-1542

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fluegge (Last name), Lynn (First name), Roy (Middle name)

Exact Title PUPILLOGRAPHY STUDY: RELATIONSHIP BETWEEN VOCATIONALLY OREIENTED STIMULI AND SELECTED OVIS SCALE SCORES

Degree granted Ph.S., Date 1972 No. of pages in report 79

Granted by Purdue University (Name of institution), West Lafayette, Indiana (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To test the feasibility of using pupillograohy to assess vocational interests.

Source of data and method of study:

The right eye or 30 randomly selected high school students was photographed as subjects viewed ten pictures of people at work in occupations representing the Musical Scale and Crafts and Precise Operations Scale of OVIS. Regression analysis was used to determine statistical relationships between pupillary responses and subjects' raw scores on the two OVIS scales.

Findings and Conclusions:

Some pictures selected as representative of a given OVIS scale produced statistically significant relationships between pupillary responses and the raw scores on that scale. Every picture contributed to a statistically significant relationship between pupillary responses and scores on both scales. Feasibility was indicated in that the following conclusions could be drawn:

1. Vocationally oriented pictures do elicit pupillary responses.
2. Induviduals do differ in their pupillary responses to thte same vocationally oriented picture.
3. Vocationally oriented pictures differ in their power to discriminate.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Forgey (Last name), George (First name), W. (Middle name)

Exact Title SELECTED ECONOMIC BENEFITS FROM ILLINOIS JUNIOR COLLEGE PROGRAMS

Degree granted Ph.D., Date 1971 No. of pages in report 146

Granted by ILLINOIS STATE UNIVERSITY (Name of institution) NORMAL, ILLINOIS (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1-To determine the relationship of earnings, job satisfaction and unemployment to individual, family, college and job variables existing among graduates of Illinois junior college programs; 2-To determine the earning prediction power of selected individual, family, college and job variables.

Source of data and method of study:

Data were gathered from each of the five participating colleges and the Illinois Junior College Board. In addition, quistionnaires were sent to each of the 1968 graduates of two-year programs in the five colleges. The data were subjected to appropriate statistical tests including 1) t-tests of the difference between means using a two-tailed critical region, 2) one-way analysis of variance, 3) Chi square, 4) multiple linear regression and 5) stepwise linear regression. Multiple linear regression was employed to determine the earnings explanation power of the full model and its submodels. Stepwise linear regression was used to determine the leading predictors of earnings.

Findings and Conclusions:

1. Regression analysis was useful in detecting and analyzing interactions among variables.
2. The earning explanation power of the variable "hours employed per week while attending college," in the case of a male pursuing an occupational program, accounted for 16 per cent of the earnings. This indicated taht employemtn during college years may be contributing to the occupational male student's inventory of skills which were beneficial in post-college employment.
3. Sex was one of the best predictors of earnings, accounting for 10 per cent of the earnings when all variables and all subjects were considered. Male graduates earned significantly higher earnings than did female graduates.
4. Job satisfaction was significantly related to the pursuit of an occupational program.
5. For purposes of resource allocations to junior college vocational education programs, individual and college variables offered more information than did family and job variables.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Franchak, Stephen, James
(Last name) (First name) (Middle name)

Exact Title MULTIVIEW ORTHOGRAPHIC PROJECTION CONCEPTS AND THE LEARNER: THREE INSTRUCTIONAL STRATEGIES

Degree granted Ph. D., Date 1971 No. of pages in report 220

Granted by Pennsylvania State University (Name of institution) University Park, Pennsylvania (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The major purpose of the study was to investigate the relative effectiveness of three instructional strategies for the learning of multiview orthographic projection concepts. In addition, an assessment was made of the relationship between visual-haptic aptitude scores and scores on a test of multiview orthographic projection concepts.

The instructional strategies were developed from the researcher's analysis and interpretation of certain mathematical learning models. These models dealt with concept identification. Specifically, the development was based upon a belief that learners (seventh grade boys) who receive instruction which takes into account the identification of relevant and irrelevant cues will perform higher on the criterion measure than those learners who do not receive such instruction. Irrelevant cues were defined as the learning involving one-view objects and two-view objects.

Two public school districts and one parochial school district volunteered to participate in the study. Because the time schedule of industrial arts classes differed between the two public school districts the researcher chose to conduct two studies designated as study 1 and study 2. The public schools were used for the assignment of experimental groups and the parochial schools were used in the assignment of control groups.

The population sample consisted of 144 seventh grade boys for study 1 and 107 seventh grade boys for study 2. The quasi-experimental design 10 by Campbell and Stanley (1969) was used for the purposes of this study.

Treatment consisted of six lessons on multiview orthographic projection concepts as identified by the researcher. The treatment was administered by the regular classroom industrial arts teacher. Each teacher, one in study 1 and one in study 2, administered the three differential treatments (instructional strategies) to the randomly assigned classes of seventh grade boys. The three instructional strategies involved certain classes receiving (1) three-view orientation only, (2) other classes receiving a two-step sequence with two-view orientation first followed by three-view, and (3) a three-step sequence starting with one-view, then two-view, and finally three-view orientation.

Test instruments involved a multiview orthographic projection test and a visual-haptic aptitude test. Testing situations involved a pretest and posttests, initial learning, one-week retention, and six-weeks retention.

The main statistical procedures used for the analysis of data were the analysis of covariance and the Pearson Product Moment Correlation.

The results of this quasi-experimental study and the assumptions made in conducting it led the researcher to conclude that the collected data failed to statistically support the belief that instructional strategies, which take into account the relevant and irrelevant cues of multiview orthographic projection concepts, will enhance the learning of seventh grade boys as opposed to those instructional strategies which do not account for the relevant and irrelevant cues. Further, that visually classified learners, who seemingly would prefer visual experiences, do not necessarily have or show greater potential for learning multiview orthographic projection concepts than those classified as haptic learners.

Order No. 72-9460, 220 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Froelich (Last name), Donald (First name), Max (Middle name)

Exact Title A COMPARISON OF TWO METHODS OF ASSESSING TEXTBOOK READABILITY OF SELECTED COLLEGE LEVEL ELECTRONICS TEXTBOOKS

Degree granted Ed.D., Date 1970 No. of pages in report 165

Granted by University of Missouri -- Columbia, (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to compare the cloze readability technique with the Flesch Reading Ease Formula to ascertain the effectiveness of each in assessing the readability of selected college level electronics textbooks. The comparison was made in terms of student achievement on a multiple choice test over a passage selected from a college level electronics textbook.

METHOD OF RESEARCH: The study was conducted in three state colleges in Missouri and involved students enrolled in a basic electronics course in the Department of Industrial Education in each school.

The Flesch Reading Ease Formula was chosen for comparison with the cloze procedure in this study because of its general acceptance by textbook publishers and others as a convenient readability assessment technique.

Pearson product-moment correlations were computed to show the relationship between the cloze tests and the achievement test. T-tests of the difference between two means for correlated samples and for independent samples were computed to analyze the difference of the measures at both levels of readability.

A criterion cloze test score was employed to assess the written material as acceptable or not acceptable in comparison with reading abilities of the students.

CONCLUSIONS: Cloze test scores identified the readability levels of written technical material in a manner more consistent with the abilities of college students to comprehend the material as assessed by scores on an achievement test over the written technical material than the readability level assessment made by application of the Flesch Reading Ease Formula.

An analysis of the mean cloze test scores and of the mean achievement test scores revealed that although the Flesch Reading Ease Formula rated the technical material at the ninth and at the fifteenth grade levels of readability, the ability of the students to comprehend the written material, as assessed by the results of the achievement test, was not predicted by the readability levels as assessed by the Flesch Reading Ease Formula.

The Flesch Reading Ease Formula did not identify the readability of written technical material in a manner that was consistent with the ability of the college student to comprehend the material as assessed by an achievement test over the same material.

The results from an analysis of the mean scores of the achievement test revealed that no significant difference existed between the two levels of readability of the written material assessed by the Flesch Reading Ease Formula. In addition, the analysis of the achievement test scores revealed that there was a significant difference in the ability of the students to comprehend the written material taken from the first one-half and from the second one-half of the selected textbook passage. The Flesch Reading Ease Formula failed to identify the difference in content difficulty of the material in each one-half of the selected textbook passage.

The use of the cloze readability procedure in assessing the readability of college level electronics textbooks in terms of student comprehension of the material may be considered to be a reliable technique

Comparison of the results in analyzing the difference of the mean cloze test scores over both halves of the selected textbook passage and the difference of the achievement test scores over both halves of the selected passage indicated that the cloze readability procedure and the achievement test were in agreement in assessing the written technical material selected from the college level electronics textbook.

In view of the evidence presented in this study, it is apparent that factors in addition to those included in the Flesch Reading Ease Formula should be included in the assessment of the readability of college level electronics textbooks.

Order No. 71-3329, 165 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Frye (Last name), Ronald (First name), M. (Middle name)

Exact Title A VOCATIONAL AND EDUCATIONAL FOLLOW-UP OF DROP-OUTS AND GRADUATES OF HICKMAN HIGH SCHOOL, COLUMBIA, MISSOURI 1955-1961

Degree granted Ed.D., Date 1962 No. of pages in report 178

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To gather information concerning location, activities, educational background and employment of drop-outs and graduates of the Columbia, Missouri, Public Schools. To ascertain occupational distribution, time elapsed between school-leaving and employment, earnings of drop-outs compared to graduates, extednt former students engaged in further study, reasons given for withdrawing form college and ways in which high school training had been most beneficial or failed to meet educational and vocational needs. To discover how factors of scholastic aptitude relate to post-high-school education, occupations, place of residence and attitudes toward vocational education.

Source of data and Method of study:

Data were obtained from records of Hickman High School and an informational form mailed to 1,424 former students. These data were analyzed and reported using simple statistical procedures.

Findings and Conclusions:

1. Seventeen per cent of those who entered grade ten, for the period studied, failed to graduate.
2. It appears that Hickman High School should make provisions for more extensive training in clerical, skilled and service occupations.
3. High school graduates can expect to find employment sooner and make larger salaries than drop-outs.
4. It is apparent that most graduates of Hickman High School who entered college remain at home and enter one of the colleges or university located in Columbia. This is especially true of high ability students.
5. Groups most likely to benefit from vocational training do not favor it as much as those who are less likely to benefit by it.
6. It would seem that vocational agriculture offered on an evening or part-time basis would better meet the need s of the agricultural community in and and around Columbia rather than offering the day school program.
7. A need exists to edentify and prevent potential school-leavers from dropping out of school. Methods used to reduce drop-outs will have to reach both parents and potential school-leavers.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fukamizu (Last name), Raymond (First name), Hiroshi (Middle name)

Exact Title THE PRESENT STATUS OF PHOTOGRAPHIC INSTRUCTION IN CALIFORNIA STATE COLLEGES

Degree granted Ed.D., Date 1972 No. of pages in report 83

Granted by University of California-Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to identify (1) the emphasis of photographic instruction, (2) the strengths and weaknesses of the program, and (3) the course content of photography courses in the nineteen California State Colleges.

Data were collected principally by means of a questionnaire and by interviews. Other sources of information were five and a half years of teaching photography in the California State College system, the literature, and personal contact with other state college photography instructors.

The following is a summary of data collected:

1. Photographic instruction is offered in fourteen different departments and one school in the nineteen California State Colleges.
2. A total of twenty-eight departments and one school now offer photographic instruction in the California State Colleges.
3. Photographic instruction in the California State Colleges was first offered by San Jose State College in 1928.
4. There are fifty-four separate titled courses now offered by the California State Colleges.
5. The number of students enrolled in photography courses vary from as few as twelve per semester to as many as 350 students per semester.
6. Student interest, student enthusiasm, and enrollment of students are definite factors of strength in the photography program.
7. Space (housing), funds for expendable materials and supplies, and funds for new major equipment are definite factors of weaknesses of the photography program.
8. Photography in the California State Colleges is primarily a means or medium of communications.
9. The primary function of the photography courses is to serve other fields of study. Photography is not an end in itself, but, rather, photography is a tool or process by which one may more adequately perform the duties of his position.
10. Many of the departments offer only one or two courses while others have a diversified offering of eight or nine courses.
11. There is a high level of agreement among the photography teachers concerning the major emphasis of photographic instruction.
12. The photographic facilities in the vast majority of the California State Colleges are inadequate for proper exposures to photography students.
13. The course content and emphasis of instruction is primarily determined by the photography teacher.

Order No. 72-20,439, 83 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fuller (Last name), John (First name), Adams (Middle name)

Exact Title A COMPARISON OF THE CHARACTERISTICS OF EARLY-LEAVERS WITH THOSE OF GRADUATES FROM TECHNOLOGY PROGRAMS OF SELECTED MICHIGAN COMMUNITY COLLEGES

Degree granted Ed.D., Date 1971 No. of pages in report 132

Granted by Duke University (Name of institution), Durham, North Carolina (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Community colleges have expanded opportunities for all types of students to attend college by the "open-door" admission policy. To many students the open-door becomes a revolving door. This is especially true in the technical-vocational field, where many students become early-leavers before achieving their educational goal.

The purpose of this study was to identify characteristics and attitudes of early-leavers who started community college technical-vocational programs and did not complete them. Comparisons were also made of early-leavers with graduates of these programs in relation to the identified characteristics and attitudes.

Seven evaluation criteria were formulated for the study of the characteristics of early-leavers and graduates of technical-vocational programs: (1) A comparison of the number of high school technical-vocational preparatory courses completed by early-leavers and graduates, (2) A comparison of the ratios of students to counselors of high schools attended by early-leavers and graduates, (3) A comparison of high school grade point averages of early-leavers and graduates of technology programs, (4) A comparison of standardized test scores of early-leavers and graduates of technology programs, (5) A comparison of the initial education plans of early-leavers and graduates to determine if they intended to complete the full technical-vocational program or to attend college only long enough to gain marketable skills, (6) A comparison of financial need of early-leavers and graduates while they attended college, (7) Determining if early-leavers intend to complete technical-vocational programs by returning to college day or evening classes.

The stratified sample for the study was selected from the male freshmen and graduates of six associate degree technical-vocational programs in the 1968-1969 college year at three Michigan community colleges. The six technical-vocational programs were Accounting, Data Processing, Law Enforcement, Architectual Technology, Electronic Technology, and Mechanical Technology.

A mailed questionnaire was used to collect data about early-leavers and graduates along with college student personnel folder records. Questionnaires were mailed with a personalized letter to each former student. When necessary, the original mailing was followed by a phone call and one or two further mailings. There were 122 (81 per cent) of the early-leaver questionnaires returned. Graduates returned 132 (88 per cent) questionnaires.

The procedure for analysis included tabulating questionnaire responses and summarizing personal data for each former student responding to the questionnaire. Survey data from early-leaver and graduate responses were compared and tested for statistical significance using the t-test, chi square, and multivariate analysis of variance.

Conclusions

The following general conclusions resulted from this study:

1. The number of (college-preparatory type) mathematics courses completed by graduates is an important characteristic difference between the groups.
2. Early-leavers are less well satisfied with high school course preparation for college than the graduate group.
3. Early-leavers attend high schools with a higher student/counselor ratio than do graduates.
4. Early-leavers and graduates both want more high school counseling assistance in relation to the selection of technical-vocational college curriculums.
5. Graduates have higher high school grade point averages than early-leavers of technical-vocational programs.
6. A greater percentage of graduates than early-leavers have the associate degree as their goal. A greater percentage of the early-leavers than graduates are interested in acquiring a job or to try some college technical-vocational courses to see if they like them.
7. Early-leavers and graduates both feel that their community college experience is beneficial.
8. There is little difference in the amount of financial need between early-leaver and graduate groups.
9. Further education on a full-time or part-time basis, is planned by more than four out of five early-leavers.
10. When the five independent variables (high school mathematics courses completed, vocational courses completed, high school student/counselor ratio, high school grade point average, A.C.T. score) are considered, high school mathematics courses completed and high school student/counselor ratio differentiate most between early-leavers and graduates of technical-vocational programs.
11. Follow-up studies of early-leavers and graduates can be carried out with adequate rates of response and with reasonable validity and reliability.
12. Locating and contacting early-leavers and graduates can assist community colleges in maintaining useful communications with former students.
13. A survey of this type may provide some needed stimulus for early-leavers to reconsider additional education on a part-time or full-time basis.

Order No. 72-11,088, 132 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Fuzak (Last name), John (First name), Alexander (Middle name)

Exact Title EVALUATION OF COOPERATIVE ATTITUDES IN INDUSTRIAL ARTS CLASSES

Degree granted Ed.M., Date 1954 No. of pages in report

Granted by University of Illinois (Name of institution) Urbana, Champaign, Illinois (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

An experimental study to develop a test for measuring the results of efforts to develop cooperativeness in industrial arts classes.

Source of data and method of study:

The Thurstone technique of scale construction was adopted as offering promise for the development of a scale in which specific behavior items, relating to cooperativeness, could be assigned numerical values.

Two groups of 25 judges: industrial arts teachers and non-industrial arts teachers -- arranged sixty selected items of behavior into 12 equal intervals, which seemed to the judges to express equal differences between items. Each item was represented graphically, and the point at which the median of the group fell was accepted as the scale value of that item.

Findings and Conclusions:

The industrial arts teacher may use one of the forms of the scale, and tally the occurence of the behavior items in the scale for each of the pupils in his class. After an interval of observation (six weeks, eight weeks, or a semester) he can determine the index for each pupil by adding the scale values of the items of behavior which a pupil performed, and dividing by the number of items performed.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gale, Steve, _____
(Last name) (First name) (Middle name)

Exact Title A COMPARATIVE STUDY OF THE LECTURE DEMONSTRATION AND THE ILLUSTRATED LECTURE METHODS OF INSTRUCTION

Degree granted Ed.D., Date 1954 No. of pages in report 88

Granted by Bradley University, Peoria, Illinois
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of the investigation was to compare the learning outcomes of two instructional methods in the Hydraulic Mechanics Course at Chanute Air Force Base, Illinois. The experimental groups were taught by the Illustrated Lecture Method using Simple and Complex Training Devices; the control groups by the Lecture Demonstration Method using Simple and Complex Training Devices.

The Experiment was designed to test two null hypotheses:

a. There are no differences in learning outcomes of students who perform classroom and laboratory experiments in the Hydraulic Mechanics Course by the Lecture Demonstration Method with students for whom the same experiments are taught by the Illustrated Lecture Method.
   1. Using simple training devices.
   2. Using complex training devices.

b. There are no differences in learning outcomes when written and performance results are combined.

A randomized block type of experiment, with equal subclasses, was used. The balanced design consisted of two pair of instructors teaching one-half of the students by the control method and one-half of the students by the experimental method. The experiment involved simple training devices in week One and complex training devices in week Two. A different group of students was used in each week of instruction.

Four instructors were selected with each assigned, at random, to one control and one experimental section in each of the weeks of instruction being tested. Two instructors were used for each week of instruction. The design satisfied the criteria of replication and control – the essential requisites of a self-contained experiment.

Information on the initial status of the students was obtained from the cumulative grade of the previous ten and eleven weeks of instruction in the Hydraulic Mechanics Course. These cumulative grades were derived from the mean of a series of written and performance tests given at the end of each week of instruction.

Final evaluation included a written and performance test given at the end of each week of instruction. The written test was designed to measure some of the specific outcomes associated with the work covered in the weeks of instruction involved in the experiment. The performance test was devised to measure student ability to solve simple problems involving the equipment and materials commonly found in the Hydraulic Mechanics Course of the weeks tested.

The analysis of covariance provided the means of controlling the effects of the students' previous knowledge of the field as measured by the tests used. The level of significance was set at the five percent level.

The null hypotheses a(1) was rejected and a(2) was accepted on the written test and rejected on the performance test. The null hypotheses b was rejected when using simple training devices and accepted when using complex training devices.

On the basis of this study the experimental evidence supports the conclusions that:

1. The lecture demonstration method as now used in the Hydraulic Mechanics Course is superior to the Illustrated Lecture Method in teaching performance skills.

2. The teaching methods have a measurable influence on the written test outcomes when simple training devices are used but no measurable difference when complex training devices are used.

Inasmuch as the Air Force Technical School is interested in the development of performance skills, it appears that the lecture-demonstration (control) method is superior.

88 pages. $1.10. MicA 55-679

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Galloway (Last name), Joel (First name), David (Middle name)

Exact Title AN EXPLORATION OF THE PERSONAL, SOCIAL, EDUCATIONAL, AND EMPLOYMENT CHARACTERISTICS OF MALE INMATES ENTERING THE ILLINOIS PENAL SYSTEM

Degree granted Ed.D., Date 1972 No. of pages in report 171

Granted by University of Illinois (Name of institution), Champaign-Urbana, Ill. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To explore the personal, social, and educational characteristics and their relationships for a selected group of adult male inmates being incarcerated in the State of Illinois penal system. To identify some of the common experiences and perceptions these ment regarding their formal schooling. To compare these findings with their employment aspirations and experiences.

Source of Data and Method of Study:

Two source were used for obtaining data in this study: (1) personal records and (2) individual interviews with male inmates. This study utilized 95 variables, and the data for 76 of them had to be obtained through interviewing techniques. Descriptive statistics utilized in the analysis of the data obtained in this study included frequency distributions, Pearson correlation, n-dimensional crosstabulations, and two-way analysis of variance.

Findings and Conclusions:

The age range of the 204 male inmates was from 17 to 61 years of age. They were predominantly a young non-white group with 50.5% under 25 years of age and 65.7% non-white. The degree of recidivism was high with 78.9% of the men having previous convictions, and 67.2% of them previously incarcerated. The age at first convication had a median age of 18.6 years and the family socioeconomic level for these men was very low.

Over 67% of the inmates were high school dropouts and the school program at time of leaving school for over 78% of the men reaching ninth grade was the high school "general Program". The career education approach may be particularly appropriate for this group since the findings in this study point to an educational climate of low educational achievement, low socioeconomic environment, and an atmosphere void of future planning and occupational development.

The employment experiences for the majority of the inmates consisted of transitory, unskilled employment, There was an expressed interest in skilled serviced occupations which are obtainable objectives for prison training programs.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gallup (Last name), Lelland (First name), Leroy (Middle name)

Exact Title WORK PERFORMED BY BUILDING CONSTRUCTION TECHNICIANS WITHIN SELECTED BUILDING CONSTRUCTION COMPANIES OF MISSOURI WITH IMPLICATIONS FOR TRAINING

Degree granted Ed.D., Date 1970 No. of pages in report 178

Granted by University of Missouri -- Columbia, (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: (1) identify the occupational characteristics of building construction technicians within selected building construction firms within Missouri, (2) describe the work performed by these employees with respect to the job function involvement with Data, People, and Things, (3) identify specialized training required for employees within technician level positions, and (4) establish relationship of selected subject matter areas to building construction technology.

METHOD OF RESEARCH: Data were obtained through interviews with 25 employees from thirteen building construction firms within the State of Missouri. Interviews covered questions concerned with employee characteristics; work performed by employees within job titles; and opinions of training needed within thirteen selected subject matter areas. Work performed was analyzed by five experts to judge whether or not particular work activities required specialized training.

SUMMARY: It was found that 36 firms had 157 technician positions within their organizations. Of these, 12.76 per cent were administrators, 65.40 per cent superintendents, 19.20 per cent estimators, and 2.74 per cent engineering assistants. Respondents used in this study included five administrators, thirteen superintendents, four estimators, and three engineering assistants.

The mean total number of years of work experience for all respondents was 26.20. The mean number of work years under the respondents' present job titles was 13.88. The mean size of construction companies was 204.68 employees, based on the estimated average number of workers employed by the companies during a one-year period.

An office location was utilized by administrators 75.00 per cent of their work day; superintendents spent 78.23 per cent of their working day on the job site; estimators spent 88.75 per cent of their time within the office; and engineering assistants split their time between the office (43.33 per cent) and the job site (40.00 per cent).

An identified total of 84 job functions were performed by the respondents. Some of these job functions were unique to a particular job title area and some were shared with other job title areas. These job functions included eleven unique and 36 shared for administrators; superintendents, 29 unique and six shared; estimators, two unique and 33 shared; and engineering assistants, one unique and 21 shared.

Of the 84 job functions performed, 43 required involvement with Data, 40 required involvement with People, and one required involvement with Things.

CONCLUSIONS: The term "building construction technician" is a term applied to the building construction industry encompassing a specified level of job title areas for the convenience of education and training. Work performed by technicians requires specialized training and involves both on-the-job and pre-employment training within thirteen subject matter areas.

Technicians with the job title of administrator, estimator, or engineering assistant tend to have a similarity of job functions whereas superintendents tend to remain a unique group.

IMPLICATIONS: Duties performed by administrators, estimators, and engineering assistants present a need for a common core of knowledge while superintendents require their own subject matter content.

Technicians indicated the necessity for training programs beyond the secondary school level which would provide both work experience and occupational education.

Training for technicians should center around new advancements within the industry concerning materials, methods, and techniques.

Order No. 71-3330, 178 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gassert (Last name), William (First name), Morris (Middle name)

Exact Title AN APPRAISAL OF THE OCCUPATIONAL CURRICULUM OF PULLMAN HIGH SCHOOL, PULLMAN, WASHINGTON

Degree granted Ed.D., Date 1972 No. of pages in report 161

Granted by Washington State University (Name of institution) Pullman, Washington (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to appraise the curricular offerings of Pullman High School, Pullman, Washington as preparation for the world of work, and to make recommendations for changes required to better prepare students for entrance into the labor market.

The prime source of information was a survey instrument submitted to graduates of the high school which asked their opinions and recommendations in the areas of curriculum, counseling, and adult education programs. The data obtained were analyzed using simple statistical procedures, and the results are presented descriptively in the study.

The major findings and conclusions resulting from an analysis of the data follow:

1. Occupational offerings should not be determined on the basis of local or state employment requirements.
2. An expanded, improved, and more topical program of occupational education is needed.
3. Adult education programs are worthwhile, and the primary criterion for such a program should be interest. If sufficient persons are interested in a particular course, then that course should be offered.
4. Of all the curricular offerings, the respondents placed greatest emphasis on mathematics, communicative skills, social studies, and the sciences as preparation for work.
5. A definite need was expressed for increased vocational offerings and expanded cooperative education programs.
6. A rather unfavorable overall impression of guidance and counseling was derived from the study, indicating a need for increased communication between counselors and students.

During the course of the study, several areas of interest were encountered which suggested the desirability of further study. These include: (1) a study to determine the perceptions of the educators and the lay citizens of the Pullman community with respect to occupational programs in the school system, (2) a study to compare graduates' actual occupations with their occupational aspirations while they were in school, and (3) a study to determine the need for post-high school guidance services for former students who do not go on to post-secondary education.

Order No. 72-18,513, 161 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gauthier (Last name), Michael (First name), Kent (Middle name)

Exact Title INSTRUMENTATION TECHNOLOGY: A CURRICULUM STUDY

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To document and summarize the curriculum practices in instrumentation technology in the United States in 1971 and to document industry's requirements for a fresh-out-of-school instrumentation technician.

Source of data and method of study:

Ninety-one junior colleges and technical institutes were surveyed, and it was found that only 31 currently have a two-year instrumentation curriculum. The curricula of these schools were evaluated and reported. Industry's responses were recorded on a special questionnaire developed for this research project.

Findings and Conclusions:

The responses to industry's questionnaire are listed in detail, along with a two-dimensional graphic display for an in-depth analysis of the results.

Based on the material gathered, a suggested instrumentation technology curriculum was developed. This is included in addition to recommended course outlines, and other information compiled during the time of this study.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gebhart (Last name), Richard (First name), H. (Middle name)

Exact Title A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL

Degree granted Ed.D., Date 1971 No. of pages in report 289

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose. The purpose of this study was to ascertain the relative effect of two instructional approaches upon students' understanding of industrial enterprise. Specifically, the study attempted to ascertain the extent to which two differing instructional approaches affected (1) informational achievement, (2) attitude, (3) retention of technical information, and (4) the differential effect upon students of differing abilities.

Method of research. This study was conducted as an experimental field study in which a comparison of two instructional approaches was made in the industrial arts laboratory. Five classes of eighth grade industrial arts students were used for each of two instructional approaches. The study was conducted in the public schools of Eau Claire, Wisconsin, Rice Lake, Wisconsin, and Wausau, Wisconsin, during the first four weeks of the second semester of the 1970-71 school year. The experimental factor which was varied for each of the two instructional groups was the student activity whereby the students experienced selected content in eighth grade industrial arts. The procedure required the control or equalization of factors affecting the student learning in the area of understanding industrial enterprise, except the experimental factor which was the instructional approach. This experimental factor was varied for each of two groups in the experiment. Measures of the dependent variable were secured immediately before and immediately after the treatments to ascertain the relative effect of each approach upon the variables. Four weeks after post-test, a retention test was also administered. The two approaches to teaching were Approach A, the experimental approach which involved group activity in a student enterprise that planned and developed, produced, and distributed products, and Approach B, the control approach in which students made individual projects. Each teacher received a detailed teacher's guide which contained lesson plans for Approach A and Approach B. Students in both approaches received identical reading material.

Findings and conclusions. In two of the three replications a significant difference was found between achievement of Approach A (the enterprise approach) students and achievement of Approach B (the project approach) students. The third replication showed the same direction, but not to the .05 level of significance. Therefore, it is concluded that Approach A will be more effective than Approach B to assisting youth in the development of an understanding of industrial enterprise.

The data reported in two of the three replications indicated that high ability students achieve at a significantly greater level with regard to informational achievement than low ability students. Therefore, it is concluded that high ability students exposed to either the enterprise approach or the project approach will be more likely to achieve course goals than low ability students.

Since no significant difference was found, in any of the schools, between the attitude of Approach A students and the attitude of Approach B students toward their industrial arts courses at the end of the experiment, it may be concluded that the two approaches were not differentially effective in their impact on student attitudes.

Although the groups exposed to instructional Approach A (the enterprise approach) evidenced a slightly higher mean score on the informational achievement retention test than the groups exposed to instructional Approach B (the project approach), the study failed to reveal a significantly superior approach for promoting greater retention of content related to the development of an understanding of industrial enterprise through industrial arts.

Order No. 72-10,553, 289 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gedeon (Last name), David (First name), Vernon (Middle name)

Exact Title TRANSFER OF A PERCEPTUAL-MOTOR TASK AS A FUNCTION OF VARIETY OF TASK AND PRACTICE

Degree granted Ed.D, Date 1971 No. of pages in report 107

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

It was the purpose of this study to compare the amount of transfer from a single task as compared to a variety of tasks (varied one and three ways) to a similar but more complex transfer task and to ascertain the effects of different amounts of practice on transfer.

This study was conducted as a six-group controlled experiment using a 2 x 3 factorial design with two levels of variety of task and three treatments of various amounts of practice.

A total of 60 subjects were randomly selected from a population of 150 seventh and eighth grade summer school students and randomly assigned to four experimental groups and two control groups.

The learning and transfer tasks consisted of the subject interpreting electrical circuits which were varied in configuration and number of components and the assembly of the circuits. A measure of speed and accuracy of assembly was recorded.

A two-way analysis of variance was used to test the results of speed and accuracy on transfer. The test revealed no significant difference between three variations in training versus one variation in task training on both speed and accuracy. Thus it may be concluded that variety of task has no effect in facilitating the transfer of speed and accuracy on a perceptual-motor task.

The effects of number of practice sessions was significant at the .01 level for speed and at the .05 level for accuracy. Tukey's test indicated that one session of practice (six trials) and three sessions of practice (18 trials) were compared to the control groups on both speed and accuracy; three sessions of practice was significant. Therefore, it may be concluded that three sessions of practice has a greater effect in facilitating transfer of both speed and accuracy on a perceptual-motor task.

No significant interaction effects were observed between variety of task and number of practice sessions for both speed and accuracy on transfer.

A two-way analysis of variance was used to test the results of speed and accuracy in learning. The analysis revealed that variety of task in learning to acquire speed of performance was significant at the .05 level with one variation being superior than three variations in task training. Thus, it may be concluded that high performance of speed in learning may be achieved by not introducing any variation in task stimulus during training. Number of practice sessions was significant at the .01 level with three sessions being superior to one session. Therefore, it may be concluded that three sessions of practice (18 trials) on a perceptual-motor task may be used as the level of practice to achieve a fast performance speed. No significant interaction was found.

The effects of variety of task in learning to acquire accuracy of performance was not found significant. Thus, it may be concluded that one or three variations may be introduced in the training task stimulus with equivalent results.

The number of practice sessions in achieving accuracy in learning a perceptual-motor task was significant at the .01 level. Three sessions was superior to one session of practice. Therefore, it may be concluded that three sessions of practice may be used to achieve a high degree of accuracy. No significant interaction was found.

Order No. 72-19,200, 107 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gelina (Last name) Robert Joseph (First name) _____ (Middle name)

Exact Title AN ANALYSIS OF THE INTER-RELATIONSHIPS OF SELECTED PSYCHOLOGICAL CHARACTERISTICS INHERENT TO VOCATIONAL INDUSTRIAL TEACHERS

Degree granted Ph.D., Date 1972 No. of pages in report 242

Granted by University of Maryland (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The problem of this study was twofold:

1. To determine the inter-relationships of selected psychological characteristics of the vocational industrial teacher. These characteristics were identified as a selected attitude and selected values as measured by standardized instruments.
2. To determine if there were selected psychological differences between vocational industrial teachers and academic teachers. The psychological characteristics used for differentiation were an attitude and personal values.

Statement of the Purpose

The purpose of this study was:

To better describe the type of individual, from the standpoint of an attitude and values, who was teaching in the vocational industrial programs and taking in-service courses in the State of Maryland.

The literature revealed that teaching attitude was an important variable in the makeup of the total teacher. The literature also revealed that limited research had been conducted concerning the attitude of the vocational industrial teacher toward teaching. Values and their relationship to attitudes were also found to be an area in which very little research had been conducted. Therefore, this study sought to predict and describe the teaching attitude and values held by the vocational industrial teacher.

The instrument selected to measure teaching attitude was the *Minnesota Teacher Attitude Inventory* (MTAI) which represented the criterion variable. The instrument to measure personal values and work values were the *Study of Values* and the *Work Values Inventory*. The demographic information was collected from a questionnaire constructed by the author. Personal values, work values, and demographic information were identified as the predictor variables.

The population consisted of all vocational industrial teachers and aspiring teachers taking certification courses offered by the University of Maryland. The teachers and teacher aspirants, who totaled 345, were administered the three instruments at one of the seven testing locations. The testing locations were the centers where the University of Maryland offered preparatory courses for vocational industrial teachers.

The establishment of a single population, based on the MTAI, was undertaken prior to comparison of vocational industrial and academic teachers on the measure of an attitude and personal values and the prediction of teaching attitude. The single population was established through a comparison of MTAI scores based on testing location and teacher-teacher aspirants. In both cases, it was found that there was no significant difference between groups. Therefore, the population was singular based on testing location and teacher-teacher aspirants.

The comparison of vocational industrial and academic teachers on the measure of an attitude and personal values indicated the following:

MTAI - The academic teachers scored significantly higher than the vocational industrial teachers.

Study of Values

Theoretical - There was no significant difference between vocational industrial and academic teachers.

Economic - There was no significant difference between vocational industrial and academic teachers.

Aesthetic - The vocational industrial teachers scored significantly higher than academic teachers.

Social - The vocational industrial teachers scored significantly higher than academic teachers.

Political - The academic teachers scored significantly higher than the vocational industrial teachers.

Religious - The academic teachers scored significantly higher than the vocational industrial teachers.

The prediction of teaching attitude from personal values, work values, and demographic information was accomplished through the use of Multiple Linear Regression Analysis. The correlations between the variables ranged from -.495 to +.640 with a median correlation coefficient of +.199. The total number of original predictor variables was extremely large, therefore, only the variables that contributed significantly to the multiple R were used as predictors. The multiple R produced was .6474 which was able to account for 42 percent of the variance in prediction of the MTAI. The final variables which were retained under the heading of personal values were all the variables of the *Study of Values;* under the heading of work values, all the variables of the *Work Values Inventory* were retained, and under the heading of demographic information, the variables identified as sex, certification, post high school experience, degree, teaching satisfaction, and occupational area were kept.

The regression equation was subjected to a process identified as cross-validation for the purpose of establishing its predictability in a similar group. For this process, the total population was randomly divided into two equal groups and a regression equation was generated using one of the half groups. The newly generated regression equation was then used to predict the teaching attitude of the other group. A correlation coefficient was then obtained between the predicted and achieved scores for the second group. The correlation coefficient obtained was .492 which was significant at the .001 level. Therefore, the regression equation had predictability from one group of vocational industrial teachers to a similar group.

Order No. 72-18,949, 242 pages.

SOURCE SLIP FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gietl, Rudy, Edwin
(Last name) (First name) (Middle name)

Exact Title A TASK ANALYSIS OF DRAFTING STANDARDS IN SELECTED INDUSTRIES OF SOUTHERN CALIFORNIA

Degree granted Ed.D., Date 1971 No. of pages in report 216

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

It was the purpose of this study to (1) identify and analyze various drafting techniques which occur in the drafting industry; (2) determine by means of the survey and questionnaire which of these techniques are practiced most consistently by draftsmen throughout the Southern California area; (3) analyze various factors that might influence the use of any particular style; and (4) determine what reference materials are being used as sources of drafting standards.

The subject material for consideration within this study was obtained from these principle sources:

(1) observation and analysis of working drawings selected from drafting agencies; (2) interviews with draftsmen, chief draftsmen, line supervisors and drafting instructors; and (3) drafting texts and references. From the findings received from these sources, a questionnaire was designed to provide data relating to both the training and experiences of the respondents as well as their preference of drafting conventions, symbols and techniques. The function of that part of the questionnaire was to determine those drafting techniques which might be considered, by the frequency of their usage and standards of the practice.

The data used as a basis for this study were gathered from a total of 43 respondents. The training experience and background of the respondents was similar in that 60 per cent of those questioned had ten or more years of drafting experience and had been trained to some degree in the southwestern part of the United States.

Fifty per cent of those questioned reported that their office did adhere to a uniform drafting style and that the medium by which standards were taught to new personnel was by means of observation.

An analysis of the responses relating to drafting techniques reveals that when given a choice of several drafting techniques or conventions which vary in complexity, the respondents consistently selected those alternates which were most abbreviated in form. Drafting techniques did not consistently conform to normal drafting rules which have been adopted by the American Standards Association. However, these violations were used to show contrast on a drawing, which might otherwise be confusing.

When given a choice in the selection of a style of lettering favorable to the respondents, the style which would be considered most conventional or simple was consistently selected. This same tendency appears in the draftsmen's selection of numerals.

Order No. 72-2818, 216 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gilbert (Last name), Paul (First name), Steven (Middle name)

Exact Title RELATIONSHIPS OF FEDERAL GRANT-IN-AID PROGRAMS TO NATIONAL GOALS FOR VOCATIONAL EDUCATION AND GOALS FOR GRANTS-IN-AID

Degree granted Ph.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

This study evaluates several allotment formulas for Federal vocational educational education grants. The formulas are rated in terms of the relationships which their state allotments have to state percentages of national measures of criteria for distributing Federal funds.

Source of data and method of study

Recent writings on vocationl education goals and on general goals for grants-in-aid were reviewed to obtain goals for vocational education grants. For these goals, eight related criteria with measures which were available for all 50 states were found. Most of thes measures were for the 1969-70 school year. Nine allotment formulas were then constructed using bases related to the potential or actual load of vocational education students, fiscal needs of states or fiscal efforts of states. Of these, six were judged acceptable as they had data bases which were not subject to manipulation by school officials, were relatively dependable and were periodically updated.

Findings and Conclusions:

Formulas which best matched all criterion measures were based on population, weighted population and school enrollment. Of these three allotment formulas, the enrollment formula gives the most states the highest allotment they receive. Hence, the enrollment formula is suggested as the formula which might secure the largest political backing of the three formulas which best match all criteria.

Recommendations regarding the improvement of vocational education national data gathering efforts with particular emphasis on enrollment and expenditure data are made, and the suggestion made that a pilot project of Federally supported job placement services be provided at some schools to encourage the placing of more trained students and to provide information for use in updating vocational education courses.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gilbreath (Last name), Tommy (First name), Dee (Middle name)

Exact Title AN EVALUATION OF A MODIFIED COORDINATED VOCATIONAL-ACADEMIC EDUCATION PROGRAM FOR POTENTIAL DROPOUTS IN THE AUSTIN PUBLIC SCHOOLS

Degree granted Ed.D., Date 1971 No. of pages in report 150

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine the degree of success of a pilot program in the Austin Independent School District. The program, entitled "General Mechanical Technology," was limited to ninth and tenth grade students at one high school in Austin, Texas.

Data were collected concerning student attitudes about school by using an attitude scale constructed for this purpose. In addition, data were gathered by use of school records pertaining to attendance, academic grades, and referrals to the office for disciplinary reasons. The data were compared among these groups: the students in the program, a remedial reading group, and an "average" English class. A comparison was made for the year before the students were enrolled in General Mechanical Technology versus the year in which they were involved in the program. A periodic evaluation was conducted by administering a monthly questionnaire to determine student reaction to various parts of the program. An interview was conducted with personnel involved in the program to determine their evaluation.

Principal conclusions from this study were as follows:

1. The program was not a success in terms of its stated objectives.
2. Lack of leadership and poor coordination of teaching activities contributed to this lack of success.
3. Financial difficulties in the school system also contributed to the lack of success.
4. Some positive—though intangible—benefits of the program were enjoyed by the students.
5. The personnel involved in the program believed the basic philosophy to be sound, and if properly implemented, could bring the program to successful fruition.

Recommendations derived from the study are as follows:

1. On the basis of observed deficiencies for the first two years of the program, establish guidelines and curriculum material in printed form for the various personnel involved in the program.
2. Establish a time schedule that will allow teachers to work together in planning their activities so that their teaching methods may complement each other.
3. Provide leadership that will merge with the supervisory activities of the coordinators to give positive direction to the program.
4. Conduct a follow-up study of the students in the program at a two-year and a four-year interval to determine their success and their evaluation of the program.
5. Conduct a separate evaluation of the program when a more favorable financial structure exists and when better coordination among teachers and administrative personnel is established.

Order No. 72-5729, 150 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gill (Last name), Roy (First name), Claire (Middle name)

Exact Title THE RELATIVE IMPORTANCE OF SPECIFIC INDUSTRIAL ARTS OBJECTIVES FOR AVERAGE AND RETARDED STUDENTS

Degree granted Ed.D., Date 1972 No. of pages in report 252

Granted by Arizona State University (Name of institution), Tempe, Arizona (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE OF THE STUDY

The purpose of this study was: (1) to ascertain relationships in the rank orders of emphasis placed upon industrial arts objectives for average and for mentally retarded students, (2) to analyze relationships between certain factors in the industrial arts teachers' selection of objectives for the mentally retarded, and (3) to analyze relationships between industrial arts teachers' and special education teachers' ranks for the objectives for the mentally retarded.

PROCEDURES

The literature and research with respect to the mentally retarded in industrial arts and the objectives of industrial arts were reviewed. Ten major objectives were identified for the study. Two questionnaires were developed, validated, and sent to all Arizona public high school industrial arts and special education teachers. All data were collected between April 12, and May 5, 1971. Descriptive and inferential statistical analyses were made from the data and Spearman's Rank-Difference Correlation of Coefficient was utilized to test the twelve null hypotheses. The three factors analyzed with respect to industrial arts teachers' ranks were: (1) training in mental retardation, (2) viewpoint of the importance of industrial arts in the education of mentally retarded, and (3) degree of problem providing for the mentally retarded.

FINDINGS

1. Over 87% of the industrial arts teachers had no training in mental retardation. Nearly 90% viewed industrial arts as highly important in the education of the mentally retarded. Approximately 27% experienced a major problem providing for mentally retarded students.
2. Over 86% of the industrial arts teachers ranked the objectives for mentally retarded students in a different order than for average students, while less than 14% ranked them exactly the same.
3. Industrial arts teachers' ranks for objectives for average and for mentally retarded students were independent.
4. Industrial arts teachers' and special education teachers' ranks for objectives for the mentally retarded were positively related.
5. The ranks for objectives by industrial arts teachers with and without training in mental retardation were positively related to those of special education teachers.
6. The ranks for objectives by industrial arts teachers who viewed industrial arts as high in importance in the education of mentally retarded students were positively correlated to special education teachers' ranks for objectives while the ranks of those who viewed industrial arts as low in importance were independent of special education teachers' ranks.
7. The ranks for objectives by industrial arts teachers who experienced a major problem providing for the retarded were independent of special education teachers' ranks, while the ranks of those who experienced only a minor problem were positively correlated to special education teachers' ranks.

CONCLUSIONS

1. The high response obtained from both populations indicated a high degree of teacher interest and concern over the problem of the investigation.
2. Most industrial arts teachers reported a different order of emphasis upon objectives for the retarded than for average students and their order for retarded students was in agreement with special education teachers' recommendations.
3. Training in mental retardation did not appear to be a significant factor in the industrial arts teachers' selection of objectives for the retarded.
4. The teachers' viewpoint regarding the importance of industrial arts in the education of the mentally retarded appeared to be significant in the selection of objectives for the retarded. Those who viewed it as high in importance tended to emphasize more appropriate objectives than those who viewed it as low in importance.
5. The degree of problem which the teacher experienced providing for the retarded appeared related to the objectives emphasized. Those who had a major problem tended to emphasize objectives significantly different than those recommended by special education teachers, while those who had only a minor problem tended to emphasize objectives similar to special education teachers' recommendations.

Order No. 72-15,610, 252 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gimbel (Last name), Armin (First name), F. (Middle name)

Exact Title THE GRANTING OF GRADUATE CREDIT FOR MANIPULATIVE WORK

Degree granted Ed.D., Date 1953 No. of pages in report 184

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This work is a study of the status of the practice of granting graduate credit for manipulative work, both on the masters' and doctoral levels, the degree to which the practice of granting graduate credit for manipulative work is pursued at present and why the practice was initiated in the various schools. The attitudes of secondary teachers, college and university teachers, heads of departments in teacher-training institutions, and supervisors of industrial education have been solicited, tabulated, and recorded.

The material and information which was gathered in this study is discussed under the following headings:

Personal Data and Opinions of All Respondents
- **Positions they hold**
- **Years of experience in field**
- **Highest degree they hold**
- **Degree toward which they are working**
- **Advanced study planned**
- **Type of training they have had**
- **Adequacy of their training**
- **Deficiencies of their training**
- **Courses they now teach**
- **Courses they feel they need**
- **Manipulative hours they recommend**
- **Crafts they teach**
- **Crafts they recommend**
- **Opinion of Ed.D. programs**
- **Weaknesses of Ed.D. programs**
- **Evaluation of manipulative work**
- **Fields of primary and secondary importance**
- **Opinions concerning graduate skills training**
- **Types of graduate programs they recommend**
- **Plans for handling graduate manipulative work**
- **Breadth of training necessary for supervisors and department heads**

Opinions of Department Heads and College Teachers
- **Manipulative offerings in their programs**
- **Manipulative hours they recommend**
- **Number of areas of training they recommend**
- **Number of hours in each area they recommend**
- **Special preparation in one area**
- **Hours in a special area they recommend**

Opinions of Department Heads Concerning Their Programs
- **Effect of additional required hours**
- **Graduate credit for manipulative courses**
- **Year the program was introduced**
- **Why started**
- **Values experienced**
- **Problems experienced**

[illegible] credit for manipulative courses
Program [illegible]
Values [illegible]
Provisi[illegible] meeting skill needs

Opinions [illegible] supervisors Concerning Teacher Traini[illegible]
Adequacy [illegible] training at bachelors' level
Adequacy [illegible] training at masters' level
In-service [illegible]
Causes of [illegible] failure

For the convenience of the reader, the high lights of the study are [illegible] in a summary.

Microfilm [illegible] of complete manuscript of 184 pages, $2.30. [illegible] enlargements 6" x 8", 10¢ per page. Library of Con[illegible] card number Mic A53-1931.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Glenn (Last name), John (First name), W. (Middle name)

Exact Title STATUS AND EFFECTIVENESS OF GENERAL AND VOCATIONAL EDUCATION PROGRAMS IN CORRECTIONAL INSTITUTIONS OF MISSOURI

Degree granted Ph.D., Date 1966 No. of pages in report 189

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain 1) the need for educational upgrading of adult inmates in correctional institutions of Missouri, 2) the status of general and vocational education programs in these institutions, and 3) whether or not parolees who had participated in the educational programs during confinement were ables to make a significantly better social and occupatioanl readjustment in civilian life than those who had not participated.

Source of data and method of study:

Information regarding the need for educational upgrading of inmates was derived from the permanent records at the Diagnostic Center in the Missouri Department of Corrections. Data concerning the status of the general and vocational education programs were obtained from the following sources: interviews with directors of educational programs in the five instidutions; interviews with a 10 per cent random sample of the inmate student population of each institution; educational and personnel records; and the researcher's observations. Statistical tests of the significance of the differences between means and percentages were employed to test five null hupotheses which pertained to post-release adjustment of parolees who had participated in education programs during their confinement as oppcsed to those parolees who had not participated.

Findings and Conclusions:

A definite need exists for both general and vocational upgrading of the inmates confined in Missouri corrctional institutions. The average sentence length and age levels indicate that inmates would have sufficient time to obtain considerable occupational and vocational upgrading--yet their age at release would not hinder employement possibilities. Although both general and vocational programs consist of considerable breadth and depth, improvement and expansion is needed with regard to facilities and equipment. Inmates who participate in education programs during comfinement may be expected to require less public aid for themselves and their dependents.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Goldman (Last name), Robert (First name), Charlie (Middle name)

Exact Title THE GENERAL APTITUDE TEST BATTERY AS A PREDICTOR OF STUDENT SUCCESS IN SEVEN AREA VOCATIONAL-TECHNICAL SCHOOLS IN ARKANSAS

Degree granted Ed.D., Date 1971 No. of pages in report 173

Granted by The University of Mississippi (Name of institution) University, Mississippi (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The study was designed to identify and examine the aptitude scores of successful and unsuccessful students enrolled in seven area vocational-technical schools in Arkansas, 1967-70, in order to determine which aptitudes best predict student success in the area schools. The aptitude scores were derived from the General Aptitude Test Battery (GATB).

The aptitude scores used in the study represented 2,065 students enrolled in 18 programs. The programs represented were Appliance and Refrigeration, Automobile Body Repair, Automobile Mechanics, Business Education, Carpentry, Cosmetology, Diesel Mechanics, Drafting, Electronic Data Processing, Electronics, Food Processing, Heavy Equipment Operation, Horticulture and Landscaping, Licensed Practical Nursing, Machine Shop, Printing, Sheet Metal Fabrication, and Welding.

The GATB scores of successful and unsuccessful students were collected, organized by programs, and tabulated. The mean score for each aptitude of students enrolled in each program was computed to serve as a method for comparing individual scores to the typical or central score. Students scoring above the mean were categorized as above mean and those scoring below the mean or on the mean were categorized as below mean. The chi-square formula for four-fold contingency tables was then used to test the null hypothesis of each aptitude in each program that there was no significant difference between the aptitude scores of successful students and the aptitude scores of unsuccessful students at the .05 level of significance.

The findings of the study were that there were no significant differences between the aptitude scores of successful and unsuccessful students in thirteen programs. A significant difference was found in one aptitude (P: form perception) between the aptitude scores of successful and unsuccessful students in the Automobile Body Repair program, in one aptitude (N: numerical aptitude) between the aptitude scores of successful and unsuccessful students in the Machine Shop program, and in one aptitude (F: finger dexterity) between the aptitude scores of successful and unsuccessful students in the Welding program. Significant differences were shown in two aptitudes (K: motor coordination, M: manual dexterity) in the Appliance and Refrigeration program. Four aptitudes (G: intelligence, V: verbal aptitude, N: numerical aptitude, S: spatial aptitude) produced significant differences in the Business Education program.

It was concluded that the General Aptitude Test Battery was not a valid instrument for predicting student success in the seven area vocational-technical schools in Arkansas during the 1967-70 period.

Order No. 72-3922, 173 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gordon (Last name), Kennith (First name), Glenn (Middle name)

Exact Title THE EDUCATION, TRAINING, AND CLASSIFICATION OF MARINE TECHNICAL PERSONNEL (SEAGOING)

Degree granted Ph.D., Date 1971 No. of pages in report 230

Granted by Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The study was designed to ascertain and describe the essential educational, training, and classification characteristics of marine technical personnel, and to suggest their implications to oceanographers, technical educators and institutional administrators who might be concerned with developing or coordinating programs in marine technology. The methodology employed included direct observations and extensive interviews with over one hundred marine technical and scientific personnel, including representatives from three countries: The United States, Norway, and The Federal Republic of Germany. Data were obtained from a pilot study of selected marine-related employers in Florida and reinforced by a follow-on study consisting of interviews and observations at sea on board seven oceanographic research vessels owned or operated by Florida State University, Scripps Institution of Oceanography, Texas A&M University, the U.S. Navy, the U.S. Coast Guard, the German Hydrographic Institute, the Norwegian Fishery Institute.

The results of the study revealed that marine technical student candidates must exhibit a strong affinity for the sea and its conditions as a prerequisite to successful oceanic employment, that practical experience in the oceanographic environment should be a mandatory requirement prior to certification as a marine technician or technologist, and that the current job market for marine technical personnel is at or near the saturation point. It was also found that, unlike their European counterparts, American marine technical personnel do not share peer group identity with marine scientists and oceanographers, nor do they work with as much independence and freedom. European marine technical personnel make career decisions earlier than their American counterparts because, in Europe, arrangements are made for students to obtain job experience as an integral part of their secondary education.

Marine technicians and technologists will need to continue their educations beyond the junior college level, probably through the master's, but rarely through the Ph.D. levels. Employers expressed perferences for persons who had earned at least a bachelor's degree.

Two hypotheses were tested. The first, there is no significant difference in the characteristics of marine technical personnel of the United States and selected foreign countries, was rejected. A significant difference, determined by the Sign Test, was found at the .01 level. The second, among marine scientists and oceanographers, there is no significant agreement with respect to how they classified marine technical personnel, was rejected. A mean Pearson product moment of correlation ($\bar{r}$) of .927 was found among a select panel of 14 marine scientists and oceanographers, indicating a significant agreement at the .01 level. Test data for the second hypothesis were obtained with the aid of a Q-sort deck composed of 60 captioned photographs. From the same deck, it was possible to validate a classification of marine technical personnel which included in ascending hierarchical order: Marine Technical (Oceanographic) Aides, Marine Technicians, Resident Marine Technicians, Senior (Chief) Marine Technicians, and Marine Technologists.

Order No. 72-13,508, 230 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gradwell (Last name), John (First name), Brian (Middle name)

Exact Title COMMONALITIES IN AGRICULTURAL MECHANICA AND INDUSTRIAL ARTS EDUCATION

Degree granted Ph.D., Date 1971 No. of pages in report 169

Granted by Iowa State University (Name of institution) Iowa City, Iowa (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The expressed purpose of this study was to identify commonalities in agricultural mechanics and industrial arts education as taught in Iowa high schools.

Teachers were randomly chosen to participate in this research according to four stratifications. First they were selected by the subject which they taught, either industrial arts or vocational agriculture, and second as to whether they combined workshop facilities with each other or used laboratories which were not shared.

A survey instrument was developed and mailed to 200 teachers. One hundred and sixty-eight of these questionnaires were returned of which 162 (81%) were usable and formed the basis for the study. Responses were analyzed by the use of the analysis of covariance, analysis of variance and least significant differences tests.

With regard to characteristics of the schools and teachers it was found that enrollment figures for the schools using separate facilities were approximately twice as large as those schools sharing facilities. Enrollment in industrial arts departments was twice that of vocational agriculture departments. Teachers using separate facilities had higher academic qualifications and industrial arts teachers had earned more college credits in laboratory related courses. The course of study primarily used to determine curriculum content was that composed by the individual teacher.

The combined list of industrial arts and vocational agriculture objectives was considered important by all groups. The extent of this importance varied; however, at least 50% of the objectives were emphasized to the same degree by the four groups. Unit shop (laboratory) areas identified as equally important by all groups either as presently taught or as projected for the future were: general metalworking, welding, electricity, power mechanics, building construction and industry and business procedures. Fewer commonalities were found in the areas of woodworking and plastics and statistically none in drafting, electronics, irrigation and soils and farm machinery.

Order No. 72-5203, 169 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Grandchamp (Last name), Robert (First name), John (Middle name)

Exact Title STUDENT PILOTS' ATTITUDES TOWARD FEAR CONCEPTS IN FLIGHT TRAINING

Degree granted Ph.D., Date 1971 No. of pages in report 167

Granted by University of Illinois at Urbana-Champaign (Name of institution), Urbana, Illinois (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The primary purpose of this investigation was to examine the attitudes that beginning flight students have toward selected fear concepts and to ascertain whether relationships exist between these attitudes and success or lack of success in learning to fly an airplane. The study was longitudinal in that it measured changes in attitudes toward selected fear concepts over a period of an academic semester while the student pilots worked toward their Private Pilot certificates. A comparison was made between the attitudes toward the fear concepts of the student pilots and (1) a group of experienced pilots, and, (2) a group of non-pilots.

The hypotheses proposed in this investigation used a null hypothesis format which stated that no change, no difference, or no relationship would found. It was proposed that there would be no change in student pilots' attitudes toward the fear concepts on any of four longitudinal measurements taken during an academic semester while they were learning to fly. The next set of hypotheses proposed that there would be no differences between student pilots' attitudes toward fear concepts and experienced pilots' or non-pilots' attitudes toward these same fear concepts. It was proposed that there would be no difference between experienced pilots' attitudes toward fear concepts and non-pilots' attitudes toward these same fear concepts. The last set of hypotheses proposed that there would be no relationship between student pilots' attitudes toward fear concepts and their success or lack of success in learning to fly as determined by the number of hours that it took them to make their first solo flight and whether or not they received their Private Pilot certificate at the end of the flight course. The statistical methods used in testing the hypotheses included: (1) an analysis of variance; (2) the *t* test for significance of differences between means; (3) the Pearson-product moment correlation; and (4) the biserial correlation.

There were three groups of subjects who participated in this study. They include the student pilot group (N=69), the experienced pilot group (N=59), and the non-pilot group (N=53). All members of these three groups were students enrolled in either aviation flight courses or engineering courses at the University of Illinois at Urbana-Champaign during the fall semester, 1970-1971.

Data gathered in this study presented evidence of longitudinal changes in student pilots' attitudes toward the fear concepts in question. In addition, the data suggested that there is a difference between student pilots', experienced pilots', and non-pilots' attitudes toward the fear concepts. No relationship was found between student pilots' attitudes toward the fear concepts as used in this study and success or lack of success in learning to fly an airplane.

Order No. 72-6937, 167 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gregg (Last name), Murry (First name), Clay (Middle name)

Exact Title A SYSTEMS MODEL FOR PLANNING AND MANAGEMENT OF THE DIVISION OF VOCATIONAL EDUCATION, JEFFERSON COUNTY SCHOOLS, BIRMINGHAM, ALABAMA

Degree granted Ed.D., Date 1972 No. of pages in report 114

Granted by University of Alabama (Name of institution) University, Alabama (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The Department of Vocational Education of the Jefferson County School System has had no formal planning program to facilitate adequate management of vocational education programs. Since decisions regarding vocational programs are frequently made in the face of complexity and rapid changes, the absence of a formal decision-making process reflects the need for management operated vocational programs.

The purpose of this study was to develop a systems model for planning and management of the Division of Vocational and Adult Education of the Jefferson County School System. It was felt that such a model could have application to other school districts of comparable size and similar characteristics in relation to social, economic, and political influences.

A study of similar school systems which offer vocational education programs was conducted. A search of related literature was conducted to survey a historical review of vocational education and the importance of planning in vocational programs, and to assimilate information relevant to developing a model for planning and management of vocational education in an urban school district. Several tools were utilized to designate operations of vocational education: paper flow analysis, flow charts, responsibility flows, and modified PERT techniques. This study has pointed out that the Director of Vocational and Adult Education does not have to accept what he is doing as sound simply because it has been past philosophy. The data collected from the various sources were compiled, studied, and analyzed in the development of a model for a systems approach to the planning and management of the Division of Vocational and Adult Education.

The study also presented the rationale for the systems approach to management that was used in the development and description of the model. Following presentation of the model the study presented the implementation plan for the newly developed model for the Jefferson County Division of Vocational Education and recommendations were made for further research and needed conceptualization.

The study attempted to identify the areas in Vocational Education programs in the local school district that have the most need for planning. An effort was made to demonstrate the feasibility of the use of the model to improve the organizational decision-making process at the top of a large, complex department of vocational education.

The model developed offered an approach to the identification of the relationships between decisions and factors of the environment in vocational education. The model attempted to systematize planning, show the interrelationships and interdependencies among planning elements, and portray the flow of information necessary to a program planning effort in vocational education at the local school district level.

The findings of the study reflect the following:

(1) No program of systematic planning exists in vocational education in Jefferson County.
(2) The systems model can provide an adequate means for planning vocational education programs by identifying problems and requirements.
(3) Planning for vocational education programs should have uniformity of application.
(4) The director of vocational education must have more conceptual data.
(5) The staff of the Department of Vocational and Adult Education can have greater impact on the development and implementation of programs.
(6) No program exists to collect data to project vocational needs.
(7) The operation of present programs is the result of ongoing functions in contrast to systematic planning.

As a result of the findings of this study, short-term and long-term goals and objectives have been established. These goals and objectives, via the systems model, reflect a comprehensive planning program that has established authority and responsibility to gain optimum decision-making for vocational education programs.

Order No. 72-17,106, 114 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Griesenbrock, Jr. (Last name) Herman (First name) _____ (Middle name)

Exact Title THE STUDENT NEEDS CONCEPT OF CURRICULUM CONSTRUCTION AND ITS APPLICATION TO INDUSTRIAL ARTS MACHINE METALWORK

Degree granted Ed.D., Date 1955 No. of pages in report 153

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to establish, through theory construction, a philosophy and the methodology of teaching industrial arts machine metalworking in a teachers college so that the needs of the students were recognized, considered, and utilized in course construction and need satisfaction.

The problems of education confronting the teachers colleges in the United States are numerous and complex, but the primary ones have to do with the ends and means of education. The day when the teacher simply assumed that his course had value is gone; for students, teachers, and critics outside the colleges are challenging such assumptions. They want to know what needs are being met by a particular course, and what means are used to achieve these educational objectives. They are no longer willing to assume that means sanctified by tradition are effective, or, granting their effectiveness, that they are best adapted to their purpose. Such challenges are a necessary part of a democratic culture; a culture which recognizes the importance of the individual personality and his interaction with the culture. The schools and colleges have as a function the responsibility of perpetuating and improving the society of which they are a part. It follows that the underlying principle of the society can best be transmitted by the schools if tney utilize these principles in the classrooms and laboratories.

The student who is a part of this educational scheme must recognize and assume his measure of responsibilities during the educational process. These responsibilities are determined, in part, by the purposes and values of the individual and, in part, through teacher student cooperative discussion and planning. The needs of the individual thus established are real and purposeful to him. They serve as a guide in formulating course content and as a means of evaluation. In educational psychology the point is made that learning takes place only when a need for such learning is felt by the individual. If these needs are established and the educative process leading to the satisfaction of these needs is carried on in a democratic atmosphere, a function of the colleges and the distinct individuality of the student may be maintained.

Techniques of organization, designed to assist the teacher in establishing the democratic atmosphere in the metalworking laboratory, and forms designed to assist in ascertaining and recording needs form a part of this study.

These forms are designed to allow a degree of latitude in order to accommodate the variety of individual purposes within a class. An attempt to specify a definite kind of behavior which should result from the utilization of these forms is to be avoided. The values and purposes of each student will determine the behavior changes which he will permit to occur.

It is conceivable that the following conditions may exist:

1. The methods of teaching industrial arts machine metalworking have remained autocratic in nature.
2. The educational institutions in a democratic society should utilize democratic methods of teaching and course organization.
3. Learning is an individual matter. The purposes, values, and abilities of the learner condition the learning process.
4. The needs of an individual give meaning, direction, and consistency to behavior.
5. It is possible to organize and administer a course in machine metalworking, utilizing democratic methods of teaching based upon the needs of the students.

153 pages. $1.91 Mic 55-465

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE &NAITTE

Author Grossel (Last name), Roger (First name), Louis (Middle name)

Exact Title A COMPUTER-BASED EDUCATION APPROACH TO ELECTRICAL NETWORK THEORY: LESSON DEVELOPMENT, USE AND EVALUATION

Degree granted Ph.D., Date 1971 No. of pages in report 81

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This research investigated the potential role of a computer-based educational system in the teaching of introductory electrical network theory. The PLATO III system at the University of Illinois, Urbana, was used in various teaching strategies to assist the teaching of selected network theory topics. Lessons (in the form of computer programs) were developed, so that about 30% of the scheduled hours were at a PLATO student console.

Several benefits from the use of PLATO were observed. First, a high degree of student achievement was obtained by use of lessons combining tutorial and drill-and-practice instructional modes. Second, the student attitude was found to be highly positive for properly working lessons. Third, the students worked alone at a console, were actively involved with the subject matter and were allowed to work at their own pace. Fourth, during the PLATO sessions, the teacher was free to roam about from student to student. He could act as an individual tutor, supplementing the PLATO program differently for each student.

Order No. 72-12,184, 81 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Guerard (Last name), Michael (First name), Peter (Middle name)

Exact Title A STUDY OF TEXAS JUNIOR COLLEGE DRAFTING AND DESIGN TECHNOLOGY CURRICULA FOR DEVELOPMENT OF A PLANNING GUIDE

Degree granted Ph.D., Date 1971 No. of pages in report 328

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of research.—It was the purpose of this research to obtain information about the structure and curricular content of existing two-year programs in Drafting and Design Technology in Texas public junior colleges and to use this information to assist in the development of a state-wide guide for planning future programs or modifying existing programs in that discipline.

Procedure of research.—A questionnaire instrument was designed and submitted to schools in Texas currently offering programs in Drafting and Design Technology. The questionnaire solicited information about each school's academic structure and requested drafting personnel to rate selected course topics as to relative importance in their programs.

Application of research.—The results of the questionnaire data were used to design a suggested procedure for establishing or modifying programs in Drafting and Design Technology. When combined with the results of facilities and industrial surveys by others, a curriculum planning guide was developed and submitted to the Occupational Research Coordinating Unit, Post-Secondary Vocational Program Development Division, Texas Education Agency, Austin, Texas.

Order No. 72-5664, 328 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Gurbach (Last name), Thomas (First name), William (Middle name)

Exact Title GRADUATE TEACHING ASSISTANTSHIP FUNCTIONS IN INDUSTRIAL EDUCATION PROGRAMS

Degree granted Ed.D., Date 1972 No. of pages in report 148

Granted by Indiana University (Name of institution) Bloomington, Indiana (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The purpose of the study was to investigate the relationship between the functions performed by graduate teaching assistants in college or university industrial education programs and selected situational and personal characteristics.

Source of data and method of study:

The survey method was used for this nationwide study. The population was comprised of all graduate teaching assistants employed in industrial education departments which grant graduate degrees. Department chairmen from 139 institutions provided the names of 319 teaching assistants. A questionnaire was developed to collect data concerning functions performed (role) by teaching assistants and selected personal and situational characteristics. The questionnaire was mailed to a census of the population. A series of 14 null hypotheses were formulated and tested to ascertain if significant relationships existed between selected variables associated with the teaching assistantship.

Findings and Conclusions:

Major results of the study suggested that: (1) More than 95 percent of the teaching assistants in industrial education programs met with students in a classroom or laboratory situation and approximately two-thireds were assigned primary teaching responsibility for one or more classes; (2) Teaching assistants employed by large doctoral degree granting institutions were generally assigned the highest level instructional resposibilities: (3) Teaching assistants who held undergraduate teaching degrees and had more than an academic year of assistantship service were assigned high level instructional responsibilities; (4) Teaching assistants who were pursuing a doctoral degree and anticipated a career in teaching were assigned the highest level instructional responsibilities.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE &NAITTE

Author Guy, Jr. (Last name), Kenneth (First name), Harold (Middle name)

Exact Title A STUDY OF STATEWIDE AND INSTITUTIONAL LONG RANGE PLANNING FOR THE IMPLEMENTATION OF OCCUPATIONAL PROGRAMS AT THE PUBLIC COMMUNITY COLLEGES IN MARYLAND

Degree granted Ed.D., Date 1972 No. of pages in report 256

Granted by University of Maryland (Name of institution) College Park, Maryland (City State)

Where Available Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The problem of this study was to collect, report and compare data related to long range planning for occupational programs at the public community colleges in Maryland. In part, the study sought to compare the long range planning documents of the Maryland Council for Higher Education (MCHE) with the "State Plan for Vocational Education" of the Maryland State Department of Education, Division of Vocational Education (DVE). It also sought to describe the process of planning for occupational programs at the community colleges.

The purpose of this study was to promote more effective planning for occupational programs at the community college level.

Information and data related to planning for occupational programs at the community colleges contained in the annual reports and other documents of the MCHE were reported and compared with the same kinds of information and data contained in the 1969 and 1970 "State Plans for Vocational-Technical Education" prepared by the DVE of the State Department of Education. The long range plans of the community colleges which were submitted to both the MCHE and the DVE were compared. The process of planning and recommendations for improvement of the process were reported. The projections of: (1) job opportunities per graduate, (2) percentage of students who completed a program, and (3) percentage of graduates who entered an occupation for which they were trained were reported for existing and planned programs through 1975. Projections of employment opportunities at the national and State level were reported for each occupational program when available.

The data reported were interpreted and conclusions were drawn. The data found in the plans of the two State agencies were inconsistent when compared. There appeared to be little coordination between the MCHE and the DVE.

Projections of employment opportunities related to the existing and planned programs by the Department of Employment Security and the Division of Vocational Education were inconsistent and frequently not available.

The MCHE manpower needs projections for graduates of associate degree nursing programs were considerably lower than the projections of the Department of Employment Security and the DVE. The MCHE recommendations suggested that no new nursing programs should be started. However, the data collected showed that a number of new programs were started.

The community colleges acknowledged deficiencies in planning at their level but also suggested that the State agencies needed to simplify the procedures of long range planning and to coordinate their requests for data collection.

The community college projections of full time teachers needed in 1975 appeared to be valid if the projections of student enrollments were achieved. The projections of teachers needed by the DVE were considerably lower than the projections of the colleges.

Recommendations derived from the study were to improve the process of planning, to improve the collection, dissemination and utilization of data needed for long range planning, and to establish a program for the preparation of teachers needed by the community colleges.

Order No. 72-18,891, 256 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hackler (Last name), Clyde (First name), Martin (Middle name)

Exact Title AN EXPERIMENTAL STUDY OF THE RELATIVE EFFECTIVENESS OF PHYSICAL AND MENTAL PRACTICE ON THE LEARNING AND RETENTION OF A SELECTED PSYCHOMOTOR TASK

Degree granted Ed.D., Date 1971 No. of pages in report 226

Granted by University of Maryland, (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was designed to test the relative effectiveness of physical and mental practice on initial learning and retention of a selected psychomotor task. The purpose of the study was to provide additional research evidence concerning the role of mental practice in developing skill in a selected psychomotor task.

An analysis of variance in a one way classification served as the major statistical treatment for this study. Duncan's New Multiple Range Test was used to locate significant F ratios. All stated hypotheses were tested at the .05 level of significance.

Three treatment groups participated in the experiment. They included: 1) Treatment I (physical practice), 2) Treatment II (mental practice), and 3) Treatment III (control). The subjects were distributed among the three treatment conditions based upon performance on the space relations part of the Differential Aptitude Test.

Subjects in treatment I (physical practice) received instruction in manual arc welding, a physical practice session, and the manipulative criterion measure immediately after the practice session and again after a three-week delay. Treatment group II (mental practice) received the instruction, the experimental practice session, and the manipulative criterion measure immediately after the practice session and again after a three-week delay. Subjects in treatment III (control) received the instruction and the manipulative criterion test at the end of the instruction session, and once again after a three-week delay.

The subjects participating in the experiment were male students enrolled in industrial education classes during the spring semester of 1970 at the University of Maryland.

The manipulative criterion test consisted of having each subject run a manual arc welding bead in the horizontal position. A mark II Brush Recorder was used to measure and record the voltage flowing in the arc gap and electrode travel speed for the welding operation. The subjects' relative ability to control the arc gap and maintain the proper electrode travel speed were reflected in the derived score.

Initial Learning. A one-way analysis of variance applied to these data indicated that a significant difference existed between the treatment group means on the criterion test for initial acquisition. Duncan's New Multiple Range Test was applied to the data in order to determine which of the treatment means were significantly different. There was no significant difference between treatment I (physical practice) and treatment II (mental practice). However, both treatment groups I and II were significantly different from treatment III (control).

Retention. A one-way analysis of variance applied to these data indicated that a significant difference existed between the treatment group means on the criterion test for retention. Duncan's New Multiple Range Test was applied to the data in order to determine which of the treatment means were significantly different. There was no significant difference between treatment I (physical practice) and treatment II (mental practice). However, both treatment groups I and II were significantly different from treatment III (control).

Conclusions. The following conclusions were made based upon the experimental findings.

Hypothesis 1. There was no significant difference between the mean score of the treatment groups as measured by the criterion test administered immediately following the practice session.

A one-way analysis of variance yielded a significant F ratio. Therefore, it was concluded that hypothesis number one was not supported by the data. However, the rejection of the hypothesis was due to the control group difference.

Hypothesis 2. There was no significant difference between the mean score of the treatment groups as measured by the criterion test administered three weeks after the practice session.

A one-way analysis of variance yielded a significant F ratio. Therefore, it was concluded that hypothesis number two was not supported by the data. Again, the rejection was due to the control group difference.

Implications for Education. In this study it was found that college level males learn the manual arc welding task by engaging in a combination practice session consisting of both mental and physical practice. Therefore, this investigator would suggest that a teacher might use mental practice as part of the methodology involved in having students learn similar psychomotor tasks.

Order No. 72-10,068, 226 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hales (Last name), James (First name), A. (Middle name)

Exact Title ESSENTIAL DETERMINANTS OF TECHNOLOGICAL LITERACY FOR HIGH SCHOOL GRADUATES

Degree granted Ed.D., Date 1972 No. of pages in report 173

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To identify the facts, principles, concepts and laws considered as essential determinants of technological literacy appropriate for high school graduates.

Source of data and method of study:

The Delphi Technique was employed to obtain the sata. A jury of ten interdisciplinary scholars was interrogated. Through the revision process peculiar to the Delphi the items were determined. A forced study comference was held to verify the jury's concensus.

Findings and Conclusions:

The items listed and classified represent the elements of technological literacy as perceived by ten experts. It is not necessarily a final list but it is a starting point in the process of determining the composition of technological literacy. The research indicates that the Delphi technique is an acceptable procedure for obtaining this kind of information.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Halfin, Harold, Herman
(Last name) (First name) (Middle name)

Exact Title TECHNOLOGY - A PROCESS APPROACH

Degree granted Ed.D., Date 1973 No. of pages in report 304

Granted by West Virginia University Morgantown, West Virginia
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:
(1) To identify the processes of a technologist. (2) Define operationally the processes identified. (3) Validate the operationally defined processes.

Source of data and method of study:
Literature search and Delphi jury validation.

Findings and Conclusions:
(1) Seventeen processes and their operational definitions were validated.
(2) The processes provide curriculum planners with an added dimension for developing curriculum related to the technologies.
(3) It was recommended that curriculum planners begin immediately to incorporate the process approach into programs of industrial arts education.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hansen (Last name), Edith (First name), Hager (Middle name)

Exact Title AN ANALYSIS OF THE VIEWS OF SELECTED LAY LEADERS IN THE STATE OF WASHINGTON REGARDING THE IMPORTANCE OF CERTAIN MAJOR EMERGING VOCATIONAL-TECHNICAL EDUCATION NEEDS

Degree granted Ed.D., Date 1972 No. of pages in report 129

Granted by Washington State University (Name of institution) Pullman, Washington (City. State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to ascertain the opinions of selected lay leaders of the State of Washington regarding the importance of certain major emerging vocational-technical education needs derived from a review of related research and thought.

Experience demonstrates that public opinion has substantial influence on the degree to which state and local school systems can provide various types of instruction and guidance and counseling. The opinions of local leaders have particular influence on general public opinion because these leaders have more than ordinary influence on the opinions and attitudes of their fellow citizens.

In May, 1970, the State Special Levy Study Commission sponsored all-day conferences in 20 Washington population centers.

An opinionnaire enabling participants to rate 18 aspects of vocational-technical education was developed to obtain opinions of conferees. The opinionnaire was filled out by 342 leaders from 143 localities. All responses were anonymous.

An analysis of the responses to the opinionnaire indicates that the opinions of local leaders regarding the desirability of modernizing various aspects of occupational education are quite congruent with those of the governmental agencies, private foundations, statesmen, and educators whose analyses of need were reviewed as a partial basis for this study.

Local school boards and vocational-technical education advisory committees have reason to expect substantial support from local leaders for modernization of occupational education programs.

Order No. 72-18,517, 129 pages.

SOURCE DOCUMENT FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Harris (Last name), Edwin (First name), James (Middle name)

Exact Title A COMPARISON OF MANUFACTURING ENGINEERING TECHNOLOGY TOPICS FOR TEACHER-EDUCATION PROGRAMS RECOMMENDED BY MANUFACTURING ENGINEERS AND INDUSTRIAL ARTS TEACHER-EDUCATORS

Degree granted Ed.D., Date 1971 No. of pages in report 165

Granted by University of Wyoming (Name of institution), Laramie, Wyoming (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary purposes of this study were (1) to determine the extent to which industrial arts teacher-educators in the Mountain States were teaching manufacturing engineering technology to prospective high-school industrial arts teachers, and further (2) to determine the opinions of industrial arts teacher-educators and of manufacturing engineers in the same geographic area as to the desirability of teaching certain manufacturing engineering technology topics to prospective high-school industrial arts teachers.

The data for this study were obtained by using two survey instruments constructed of identical manufacturing engineering technology topics which were extracted from current professional publications of the Society of Manufacturing Engineers in Detroit, Michigan. One survey instrument was sent to 98 selected manufacturing engineers for rating of the topics as desirable instructional content. The second survey instrument was sent to 38 industrial arts teacher-educators for identification of topics now offered or not offered, or offered in part, and for rating of the topics as desirable instructional content.

Among the conclusions considered to be most appropriate for industrial arts teacher-education institutions were the following:

1. Engineers and educators strongly agree as to the desirability for instructional purposes of the thirty-two topics comprising manufacturing engineering and its technology. Thus an opportunity exists for industrial arts teacher-educators to design and implement an instructional program in manufacturing engineering technology based upon these topics.
2. Since the extent to which industrial arts teacher-educators are presently offering instruction in manufacturing engineering technology to prospective high-school industrial arts teachers is inadequate, their present instructional efforts have not been broad enough to fully interpret modern industrial manufacturing to their students.
3. Mountain States industrial arts teacher-educators are not currently offering or requiring sufficient credit hours of instruction in manufacturing engineering technology; hence teacher-educators do not seem to have sufficient breadth and depth in this field to enable them to offer adequate instruction.
4. The primary purpose of industrial arts which aims at interpreting modern industry to the youth of today is being met only conditionally. Generally, industrial arts teacher-educators convey, or are able to convey only the "tradesmen" aspects (trade skill activities) of modern manufacturing industry. Manipulative skills and related information seem to be the primary basis of industrial arts content.
5. Since few industrial arts teacher-education institutions find it feasible to introduce programs in manufacturing engineering technology, the problem of obtaining qualified staff to provide instruction in manufacturing engineering technology appears to be the major obstacle to the introduction of this program.
6. The manufacturing engineers believe that the topical content of the survey instrument emphasized current principles and practices of generic manufacturing engineering and its technology, and could be part of designing teacher-education programs. Thus, content recognized by industrial personnel could be evaluated by industrial arts teacher-educators for possible adoption into instructional programs.
7. Since the materials used most frequently by industrial arts teacher-educators to acquire understanding of manufacturing engineering technology are textbooks and professional publications, there is need for the development of newer types of materials, and for the expansion of services that can be provided by qualified resource people.
8. The most widely used methods to present manufacturing engineering technology to students are textbook and lecture, laboratory experiences, and audio-visual devices. Thus field trips and resource people serving as instructors might be used to supplement these methods.
9. In contrast to the manufacturing industries, few educational institutions recognize the importance of "ear-marking" funds for the purpose of stimulating and supporting investigation into and implementation of manufacturing engineering technology. If educational institutions would set aside funds for this purpose, the relevancy gap between industrial arts education and the functions and practices of industry could be narrowed.

Order No. 72-18,931, 165 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Harrison, Denist, Dewain
(Last name) (First name) (Middle name)

Exact Title A STUDY OF ATTITUDES HELD BY SUPERINTENDENTS AND PRINCIPALS TOWARD CAREER EDUCATION IN TEXAS

Degree granted Ed.D., Date 1972 No. of pages in report 124

Granted by North Texas University, Denton, Texas
(Name of institution) (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The problem with which this investigation is concerned is to identify attitudes held by superintendents and principals in Texas public schools toward career education. Particular attention is given to the nature of career education and the development of career education from the management structure point of view. The emphasis of this study is determining what would be desirable in the planning and establishing of new directions and structures for career education in Texas public schools.

The purposes of this study are the following:

1. Ascertain the attitudes held by the superintendents and principals about expanding vocational education.
2. Ascertain if superintendents and principals view career education as an important factor in helping create a unified school system.
3. Ascertain if the philosophy of vocational education should be a more structured or a broader concept of career education.
4. Ascertain the views held by the management structure in Texas toward the progression that career education should take from elementary through secondary grades.

A Likert-type attitude scale was developed into an instrument meeting the criterion to measure attitudes of superintendents and principals toward career education. The initial instrument was presented to a panel of jurors to establish the validity of the instrument. The reliability of the instrument was established by the split-half technique. Research hypotheses were tested with the *t*-test for two independent samples and the simple analysis of variance to determine if there were significant differences in the attitudes of superintendents and principals toward statements on the instrument. The hypotheses were either retained or rejected at the .05 level of significance.

Analysis of data compiled from the responses of superintendents and principals revealed that they held favorable attitudes toward career education. Superintendents and principals did indicate that more emphasis should be placed on training students for employment, that career education could play a significant part in Texas public schools, and that students have not been provided with exploratory experiences in vocational education early enough in their development. There was no significant difference found in the attitudes of superintendents and principals toward what should be involved in career education and the progression of career education in the public schools.

The major conclusions were that the superintendents and principals would support a career education curriculum if it were introduced, that a career education curriculum could aid students in gaining skills and information about occupations that would enable them to seek employment or enter college after graduation from secondary schools, that career education would help create a unified school system, and that vocational education in Texas needs to be modified to enable more students to gain insight into the world of work.

The following recommendations were made:

1. A career education curriculum should be developed to help all students in Texas public schools gain insight into the world of work and include all levels of work from unskilled to professional.
2. The progression of a career education curriculum should involve three steps: orientation to career education in elementary school, exploration of specific clusters of occupations and selection of areas of specialization in junior high, and continuation of exploration of occupations and specialization in selected occupational areas in high school.
3. After the development of a career education curriculum, the present vocational education system should be replaced by the career education curriculum.

Order No. 72-24,186, 124 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Harrison, Jr., Russell, Sage
(Last name) (First name) (Middle name)

Exact Title CONDITIONS AND CONSEQUENCES OF VOCATIONAL OPPORTUNITY DOLLARS: THE ROLE OF FEDERAL AID IN VOCATIONAL EDUCATION

Degree granted Ph.S., Date 1971 No. of pages in report 428

Granted by University of North Carolina Chapel Hill, North Carolina
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

In the years since the passage of the Smith-Hughes Act in 1917 federal aid to states and localities for vocational education has featured the use of categorical, matching grants. These grants have grown at a rate faster than the economy as a whole. Thus the long-term trend has been for greater federal aid. This trend, however, has been subject to deceleration by Republican control of national offices and acceleration by Democratic control.

Increasing federal grants for vocational education results in varied effects on decisions by state and local governments. Systematic theoretical prediction, mathematical formulation, and statistical corroboration are used to demonstrate some of these effects.

Federal aid stimulates expenditures. Greater vocational aid leads to significantly greater efforts by states and localities in behalf of vocational education.

Federal grants indirectly affect expenditures by displacing the decision-making routines of state and local governments. Greater vocational aid reduces incrementalism, as well as concern with socio-economic constraints. It replaces those decision-making strategies with increased responsiveness to federal pressures and clientele inputs. Thus it maximizes federal dictation and clientele control, while reducing any possible coordination of programs facilitated by incrementalism or deference to socio-economic constraints.

Higher levels of federal aid weaken the stimulation of state-local expenditures, though increasing the relative use of federal expenditures. This differential stimulation leads to centralization of vocational expenditures at the federal level. In turn, centralization of expenditures leads to standardization of services among the states.

The sum of these results dramatize the ability of federal aid to affect policy routines by states and localities. National political factors play a crucial role in decisions by state and local governments.

Order No. 72-10,728, 428 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hartzon, Jr. (Last name), Wiley (First name), Gordon (Middle name)

Exact Title AN ANALYSIS OF THE PERCEPTIONS OF JUNIOR COLLEGE OCCUPATIONAL INSTRUCTORS OF ENTRY LEVEL PREPARATION OF JUNIOR COLLEGE OCCUPATIONAL INSTRUCTORS

Degree granted Ed.D., Date 1972 No. of pages in report 126

Granted by Auburn University (Name of institution) Auborn, Alabama (City. State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To survey the entry level preparation of a national sample of junior college occupational instructors and ascertain what the would desire as an adequate entry level preparation.

Source of data and method of study·

Opinionnaires were sent to 1253 part-time and full-time occupational instructors at 85 junior colleges taht were public institutions, co-educational, offering both occupational and transfer curricula and were regionally accredited. Usable responses were received from749 instructors.

Findings and Conclusions·

1. While more than one-half of the respondents reported haveing a master degree, 73% would propose a lesser degree as adequate entry level.
2. The respondents would envision a greater role in the preparation of occupaitonal instructors for the junior college.
3. The respondents reported that in eight of ten factors identified in the general education, professional education and specialized preparation of occupational instructors, they would propose a lesser amount than they had undergone or than would be required by a typical teacher preaparation curriculum.
4. More than two-thirds of the responding instructors would prefer supervised internships in the area of specialization to unsupervised employment in the area.
5. The further proposed supervised internships of a lesser length than unsupervised employment.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Haynes (Last name), Luther (First name), J. (Middle name)

Exact Title A PORTABLE NAILING MACHINE

Degree granted Ed.D., Date 1956 No. of pages in report 23

Granted by Bradley University (Name of institution) Peoria, Illinois (City. State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to design and construct a powered portable nailing device with an automatic feeding attachment which will be practical in wood construction. Because of its complexity, it is entitled a nailing machine.

The time involved in the development and construction of this machine covered a period of four years.

Inspiration for developing ideas needed for solutions of various problems encountered was found through reading, in consultations with others, and in examination of various mechanical devices and tools. Factual data for any given problem were obtained from handbooks and manuals on the subject.

Exploration of various mechanical principles was accomplished by testing working models constructed for this purpose. Several models were constructed and tested for performance before a practical machine was developed.

The final result was an efficient portable nailing machine essential in modern methods of wood construction.

23 pages. $2.00. Mic 57-1676

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Healas (Last name), Donald (First name), Vreeland (Middle name)

Exact Title A COMPARATIVE STUDY OF THE BACKGROUND AND BEHAVIOR OF REGULAR VOCATIONAL TEACHERS AND MANPOWER INSTRUCTORS

Degree granted Ed.D., Date 1972 No. of pages in report 267

Granted by Wayne State University (Name of institution) Detroit, Michigan (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: The purpose of the study was to seek answere to the following questions; (1) What were the characteristics of MDTA vocational teachers? (2) How were the distinguished from vocational teachers found in traditional situations? (3) What were the distinctive instructional values of this group vis-a-vis other teachers?

Source of data and method of study: The study involved a Test Group comprised of Manpower Instructors from the Mid Plains States and a Comparison Group comprised of Vocational Teachers from California. The study utilized personal background information and four evaluative instruments: the Otis, the Wonderlic, the 16 P.F., The Study of Values and a behavioral Questionnaire. Singnificant differences were sought between the two group using the T-Test through a computer program.

Findings and Conclusions: The following major points were uncovered: there were no significant differences found to exist between the two groups in terms of race, sex, age, or instructional areas; there were significant differences found to exist between the two groups with relation to the educational level, background, degree major, and agency representation of the participants. There were significantdifferences found to exist between the Test Group and the Comparison Group for Factor C on Sixteen Personality Factor Questionnaire; and for the Aesthetic and Social units on the Study of Values.

The low participation ratio on the part of the Test Group did not permit a review or analysis of the Otis or the Wonderlic Scores.

On the Questionnaire, there were eight items in the Training Period, 11 items in the Post Training Period, and 14 items in the Supportive Service Period that proved to exhibit signigicant differences between the Test Group and the Comparison Group.

The conclusions drawn from the summary of the data indicate that the participants of the Test Group exhibited the following tendencies: earned their credentials through life experiences; were adaptive; tended toward the middle to upper age category; appeared to have a greater interest in the welfare of people; displayed a higher social value; were individual trainee oriented; did not feel comfortable in the role of a basic education teacher nor as a counselor; and evidenced an increasing awareness of the teaching profession.

Recommendations were made relevant to the training and employment of vocational teachers. Considerations for further study were also advanced.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Heathman (Last name), James (First name), E. (Middle name)

Exact Title AN INVESTIGATION OF ATTITUDES OF NEW MEXICO EDUCATIONAL DECISION-MAKERS TOWARD VOCATIONAL EDUCATION

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by New Mexico State University (Name of institution) Las Cruces, New Mexico (City. State)

Where Available: Microfilm ( ) Microfiche (X) E.R.I.C. ( )

Purpose of Study·

To assess, compare, and contrast the attitudes of educational decision-makers in New Mexico toward vocational education.

Source of data and method of study·

The number of individuals whose participation in the study was requested totalled 718: 117 high school principals, 89 superintendents, 453 school board members, 20 state officials, and 39 influentials. Participants in the study were asked to respond to the Image of Vocatioanl Education Scale developed by Wenrich & Crowley.

Findings and Conclusions·

1. High school principals, superintendents, school board members, state officials, and influentials have positive attitudes toward vocational education.
2. Attitudes of high school principals, superintendents, and state officials tend to be more favorable toward vocational education than those of the school board members and influential.
3. All items which differentiated between attitudes of the various groups emphasized that attitudes of state officials are more positive than those of school board members.
4. School district sized in terms of student enrollment is not related to attitudes of district educational decision-makers toward vocational education.
5. Amounts budgeted for vocational education programs are not related to attitudes of district educational decision-makers toward vocational education.
6. Amounts expended for vocatonal education programs from state basic program distributions are not related to attitudes of district educational decision-makers toward vocational education.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hemler (Last name), Herman (First name), Taylor (Middle name)

Exact Title A COMPARATIVE ANALYSIS OF VOCATIONAL AND REGULAR HIGH SCHOOL PROGRAMS VIA A STUDENT FOLLOW-UP SURVEY

Degree granted ED.D., Date 1972 No. of pages in report 120

Granted by University of Southern California (Name of institution), Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose and Problem. The purpose of the study was to provide educational administrators with reliable, valid follow-up information for ascertaining the effectiveness of the different types of vocational programs in existence which would aid them in their program-development and decision-making processes. The study was designed to provide educational administrators with an analysis of three different types of secondary educational programs [regional occupational programs (ROP), regular high school programs (RHP), and regular vocational programs (RVP)] to determine whether there are differences in the rate of employment and participation in post-secondary education among these groups of students three months after graduation.

Procedures. All of the graduating seniors (1,630) from six different high schools were followed up for purposes of this study. The entire follow-up procedure was computerized with the exception of the manual coding of the responses. By using a preliminary questionnaire and three consecutive mailings of follow-up questionnaires for those students who did not respond to the previous questionnaire, a total codable response of 1,441 graduating seniors was obtained. This constituted an 88.4 per cent response, which was considered to be an adequate sample.

Findings. The following are representative findings of the study: (1) 52 per cent of the ROP, 50 per cent of the RVP and 28 per cent of the RHP participants were employed full-time or part-time; (2) 36 per cent of the ROP, 26 per cent of the RVP and 15 per cent of the RHP participants were working and going to school concurrently; (3) 80 per cent of the ROP, 73 per cent of the RVP and 56 per cent of the RHP participants were attending post-secondary education full-time or part-time; (4) 4 per cent of the ROP, 3 per cent of the RVP and 31 per cent of the RHP participants did not indicate that they were either participating in post-secondary education or working.

Conclusions. Those students who participated in a vocational education program and obtained some type of marketable skills not only had a higher success in gaining employment upon graduation from high school, but they had a higher rate of participation in post-secondary education than students who participated in just the regular high school program without obtaining a marketable skill.

Recommendations—Educational. Vocational education should be accorded its appropriate place in our education system. It should be the responsibility of all educators to not only make the programs available but to encourage their students to participate in appropriate vocational programs congruent with their interests and abilities to gain whatever entry-level marketable skills possible while they are attending school.

Recommendations—Research. Further research should be undertaken to ascertain: (1) why there was such a large percentage of students who participated in the regular high school program who did not indicate that they were either working or participating in post-secondary education; (2) whether the high percentage of vocational program students who indicated they are going to school and working concurrently are doing so because this is the only means they have for pursuing a post-secondary education; (3) the rate of the regular high school program students who are in post-secondary education and not working but are seeking employment; (4) the rate of participants from each program, regardless of what they are currently doing, who are seeking employment and/or entrance into post-secondary education and attempt to determine why they have not been able to reach their goal; (5) the rate of those students who are neither going to school nor working, who are not seeking employment or entrance into post-secondary education and why they are not. A longitudinal study of a minimum of five years should be conducted on these programs, including not only the factors covered in this particular study, but those factors mentioned in the above five recommendations for further research as well.

Order No. 72-21,676, 120 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hill (Last name), Clair (First name), S. (Middle name)

Exact Title COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTION

Degree granted Ph.D., Date 1971 No. of pages in report 198

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to compare a linear strategy of computer-assisted instruction (CAI) with a tutorial strategy of CAI and to ascertain the effectiveness of each in teaching selected cognitive elements of orthographic projection to sixth grade students. The comparison was made in terms of student achievement on the final task and the time required to complete the instructional sequence. A second concern of the study was to ascertain whether or not a student's success on the final task was a function of his visual-haptic aptitude.

METHOD OF RESEARCH: The investigation was conducted as an experimental comparison of two CAI strategies for presenting an instructional sequence in orthographic projection. The strategies utilized were: (1) Linear Strategy, a "drill and practice" level CAI presentation where students receiving information by means of this strategy received an identical sequence of instructional frames and (2) Tutorial Strategy, a "tutorial level" presentation where the computer diagnosed student errors and presented analogous information in an attempt to remedy individual learning difficulties.

Interaction between student and computer were mediated by the Conversational Programming System (CPS) and implemented by a PL/1 program through an IBM 2741 Communication Terminal. Terminals were connected by conventional telephone lines to the IBM 360/65 computer at the University of Missouri-Columbia.

The study was conducted during the second semester of the 1970-71 school year. The random sample consisted of 60 sixth grade students enrolled at the Blue Ridge Elementary School in Columbia, Missouri.

The sequence of events involved in the experiment included: (1) The *Successive Perception Test I* to assign students to the levels of visual-haptic aptitude (visual, indefinite, haptic) five days prior to the experimental treatment, (2) the experimental treatment (linear or tutorial strategy), and (3) collection of data in the form of completion time and achievement percentage score on the final task of the instructional sequence.

CONCLUSIONS: Group mean scores representing achievement on the final task for the two levels of strategy were significantly different. Students who were instructed by means of the tutorial strategy scored significantly higher than the students instructed by means of the linear strategy.

A statistically significant difference resulted when comparing students from the visual, indefinite, and haptic levels in their achievement on the final task. Visual students scores significantly higher than haptic students.

A significant difference was also shown to exist between group means which represented completion time. Students who received instruction by means of the tutorial strategy required significantly more time to complete the sequence than the group participating in the linear strategy.

No significant difference existed in the group means which represented completion time scores when comparing students from the visual, indefinite, and haptic aptitude groups. A significant difference was not found between the group mean scores representing achievement on the final task due to the interaction of strategy of presentation with the three levels of visual haptic aptitude. Furthermore, no significant difference was found between the group mean scores representing completion time due to the interaction of strategy of presentation for the visual-haptic levels.

Order No. 72-10,617, 198 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hill (Last name), Joshua (First name), _____ (Middle name)

Exact Title CONSTRUCTION AN VALIDATION OF A SCALE TO MEASURE THE VERBALIZED ATTITUDES OF INDUSTRIAL ARTS TEACHER EDUCATORS TOWARD A MAN-TECHNOLOGY MODEL

Degree granted Ed.D., Date 1972 No. of pages in report 150

Granted by West Virginia University (Name of institution), Norgantown, West Virginia (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To construct and validate a scale to measure the verbalized attitudes of industrial arts teacher educators toward a Man-Technology model for the education of industrial arts teachers.

Source of data and method of study·

A review of literature of industrial arts teacher education and the Man-Technology approach resulted in a list of items for a 88 item questionnaire which was mailed to 200 industrial arts teacher educators. Its return was synthesized and resulted in an attitude scale.

Findings and Conclusions·

All 40 items selected for the final attitude scale were positive and greater than .10. The item-total correlations ranged from a low of .52 to a high of .82 average .66. An internal consistency reliablility coefficient Alpha of .96 was computed. The reliability (statidity) coefficient of the scale was .88.

Also: 1. The scale did measure the attitude of teacher educators toward the Man-Technology model.
2. The scale topped a general attitude toward the Man-Technology model,
3. The scale differentiated between two desperate groups of teacher-educators who were identified as favorable or infavorable toward the Man-Technology model.
4. The attitude toward the model was found to be relatively stable.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hinrichs (Last name), Roy (First name), St. Amand (Middle name)

Exact Title NEED FOR TECHNICAL EDUCATION IN THE NEW ORLEANS AREA WITH IMPLICATIONS FOR THE DELGADO TECHNICAL INSTITUTE

Degree granted Ed.D., Date 1964 No. of pages in report 134

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To examine the need for technical education in the New Orleans area and to determine how the Delgado Technical Institute should be implemented to fulfill the need.

Source of data and method of study

Data for the study were obtained by means of personal interviews with school personnel and with representatives of firms in the chemical, petroleum, and space industries within New Orleans area, and from federal, state, and local publications and reports.

Findings and Conclusions

1. As there was a chortage of technicians at the time of the study, and as a shortage will apparently still exist in several technical occupations by 1968, those completing technician training should have no difficulty in finding employment as techicians in the New Orleans area.
2. As the majority of the firms expressed a desire to have the technicians they employ trained by outside agencies, it follows that these firms are willing to hire formally trained technicians.
3. Unless steps are taken to train more draftsmen, production technicians, and engineering aids, the demand for such workers will far exceed the number estimated to be trained by 1968.
4. It would appear that high school graduates are not well informed concering the opportunities in technical occupations or of the training offered at Delgado.
5. Since the projected number of technicians expected to complete training at Delgado Technical Institute by 1968 was computed on the basis of curricula now being offered, as well as curricula planned to be introduced by that time, the cancellation of any curriculum, either offered or planned, will further increase the shortage of technicians in several technical occupations by 1968.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hoffman (Last name), Larry (First name), Dean (Middle name)

Exact Title AUDIO-TUTORIAL VERSUS CONVENTIONAL METHODS OF TEACHING SLIDE RULE

Degree granted Ph.D., Date 1971 No. of pages in report 160

Granted by Iowa State University (Name of institution.) Iowa City, Iowa (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The task of teaching engineering technology students at Iowa State University how to use the slide rule has traditionally been accomplished by the conventional method of "lecture and practice" in spite of the fact that it has several shortcomings. It seemed that it might be possible to design an audio-tutorial slide rule course which would tend to eliminate, or at least minimize, the shortcomings of the conventional slide rule course.

This study is concerned with the design of an audio-tutorial slide rule course, and a comparison of actual student performance therein, versus student performance in a conventional slide rule course. The study was conducted at Iowa State University during the fall quarter 1970, and the two quarter credit engineering technology slide rule course entitled Technical Problems I was used as the vehicle for the conduct of the study. The objectives of the study were to answer the following questions:

(1) Do students who receive slide rule instruction in the audio-tutorial format learn at least as much as students who receive slide rule instruction in the conventional format?

(2) Does audio-tutorial slide rule instruction benefit some students more than others? If so, what are the characteristics of these students?

At the outset of the study a pre-test in the use of the slide rule was administered to all students in both groups, and the following null hypothesis was tested:

There is no difference between the mean scores of the experimental group and the control group on the pre-test.

This null hypothesis was not rejected, and the implication was that the students in either group were equal in their ability to use the slide rule at the outset of the study.

The analysis of other independent variable data indicated that both groups were composed of students who, on the average, were of virtually equal caliber.

During the course of the study three one-hour examinations and a post-test were administered to all students in both groups, and the following null hypotheses were tested:

(1) There is no difference between the mean scores of the experimental group and the control group on the first one-hour examination.

(2) There is no difference between the mean scores of the experimental group and the control group on the second one-hour examination.

(3) There is no difference between the mean scores of the experimental group and the control group on the third one-hour examination.

(4) There is no difference between the mean scores of the experimental group and the control group on the post-test.

(5) There is no difference between the mean total score of the experimental group and the control group.

Hypothesis (1) was rejected, (2) was rejected, (3) was not rejected, (4) was rejected, and (5) was rejected. The experimental group mean was greater than the control group mean on all three one-hour examinations and also on the post-test.

Other analyses revealed that the audio-tutorial instruction tended to boost the performance of the student with a history of low achievement more than it boosted the performance of the student with a history of high achievement.

Order No. 72-5209, 160 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE& NAITTE

Author Hoghaug (Last name), Harold (First name), Thorman (Middle name)

Exact Title MANPOWER AND TRAINING NEEDS IN FLUID POWER FOR IOWA INDUSTRIES

Degree granted Ph.D., Date 1971. No. of pages in report 185

Granted by Iowa State University (Name of institution) Iowa City, Iowa (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to survey the industries employing technicians and skilled workers in the manufacture of fluid power products and to ascertain if there is a need for persons with these types of skills. Included in this information are the number of job vacancies, replacement needs, number of firms employing technicians and skilled workers involved with fluid power, ages of these persons, hours per week these individuals are involved directly with fluid power, and projected employment needs through 1975. In addition, data were obtained to determine the relative importance of various topic items of curricular content to the fluid power technician and skilled worker.

The data are presented by fluid power medium, end-use product category, size of employing firms, and Iowa merged areas. The curricular data are presented by rated importance to the fluid power technician and skilled worker.

In summary, 81 firms were surveyed employing 254 technicians and 420 skilled workers involved with fluid power as of April 1971. Thirty-nine firms were involved in mobil hydraulics, 21 in industrial pneumatics and 11 in industrial fluidics.

The projected need for fluid power technicians represents a 18.3 percent increase from 1972 to 1975, with 11 vacancies existing in 1971. The projected need for fluid power skilled workers represents a 24.8 percent increase from 1972 to 1975, with 16 vacancies existing in 1971.

The median age of fluid power technicians was 34.7 while for skilled workers the median age was 38.9.

Technicians worked an average of 17.0 hours per week directly with fluid power while for skilled workers the average was 23.7.

It was estimated that 34.6 percent of the technicans and 48.8 percent of the skilled workers would benefit from special courses designed to upgrade their knowledge and skills. Those technicians and skilled workers that would actually attend were estimated to be 54.7 and 28.8 percent respectively.

The general categories of curricular content evaluated were: (1) communication skills, (2) mathematics, (3) supporting technical information, (4) principles of hydraulics, (5) power fluids and fluid conditioning, (6) hydraulic power distribution, (7) sources of hydraulic power, (8) control of hydraulic power, (9) hydraulic power actuators, (10) hydraulic circuits and components, (11) principles of pneumatics, (12) pneumatic components, (13) principles of fluidics and (14) fluid power maintenance and safety. Each topic item listed under the various categories was evaluated as to their importance for technicians and skilled workers involved with fluid power in the surveyed industries.

Order No. 72-12,557, 185 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Holm (Last name), Melvin (First name), G. (Middle name)

Exact Title EFFECT OF STRESS PRODUCING SITUATIONS UPON THE MANIPULATIVE PERFORMANCE OF HIGH AND LOW TEST-ANXIOUS INDUSTRIAL ARTS STUDENTS

Degree granted Ed.D., Date 1972 No. of pages in report 96

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To ascertain the effect which stress producing situations have upon the perforamnce of a manipulative task by high and low test-anxious subjects.

Source of data and method of study:

The investigation was conducted as a two-group, controlled experiment. A 2 x 2 factorial design was used with two levels of test anxiety, and two treatments (stress and non-stress). The task consisted of driving nails into blocks of wood. The two groups were tested for equivalency by means of a t-test.

Findings and Conclusions:

The findings of this experiment failed to show a significant difference in the effect of stress producing situations from that of non-stress producing situations in the quantitative output of either high or low test-anxious subjects in the performance of a manipulative task, it is concluded that under the conditions of this experiment, stress does not significantly effect the quantitative performance of a manipulative task.

The findings failed to reveal a significant difference in the effect of stress producing situations from that of non-stress producing situations in the qualitative performance of a manipulative task by either high of low test-anxious subjects, it is concluded that under the conditions of this experiment, stress does not significantly effect the quality of maipulative performance.

The findings of this experiment failed to show a difference in the manipulative performance of high and low test-anxious subjects under stress producing situations it is concluded that under the conditions of this experiment, stress does not significantly effect the manipulative performance of high and low test-anxious subjects.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Holmes (Last name), Lonnie (First name), A. (Middle name)

Exact Title AN EMPIRICAL VALIDATION OF VOCATIONAL AND TECHNICAL EDUCATION GRADUATES' INITIAL EMPLOYMENT PATTERNS

Degree granted ED.D., Date 1971 No. of pages in report 70

Granted by Oklahoma State University (Name of institution), Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Scope and Method of Study: The study was specifically concerned with identifying employment patterns of the 1969 vocational-technical education graduates from public and private schools in Oklahoma. Job titles were classified, distributed, and analyzed in the seven related vocational-technical program service divisions: office, technical, distributive, health, home economics, agriculture, and trade and industrial. This *ex-post-facto* spot time study of the 1969 graduates provided pertinent data for evaluating the effectiveness of vocational-technical programs.

Findings and Conclusions: Significant differences were found in employment patterns with an apparent need for restructuring some vocational programs relative to the seven program service divisions. Validation of supply-demand data is necessary if a realistic picture of existing conditions is to be accomplished. Present vocational-technical programs must be re-evaluated and restructured to provide a unifying educational experience meeting student needs, interests, and abilities rather than a random assemblage of unrelated and self-contained courses. Coordination of efforts by industry and educational institutions is a must if educational programs are to provide trained manpower capable of immediate gainful employment in industry.

Order No. 72-21,892, 70 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Holt (Last name), Ivin (First name), LaPhel (Middle name)

Exact Title AN EXPLORATORY STUDY IN LEARNING SEMICONDUCTOR THEORY

Degree granted Ed.D., Date 1972 No. of pages in report 172

Granted by Arizona State University (Name of institution), Tempe, Arizona (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary objective of this exploratory study was to compare the performance of two experimental student groups in the learning of semiconductor theory. Group one attended the traditional lecture-demonstration class. Group two was given the option of attending the traditional class and/or using an individualized continuous progress student centered instructional packet (SCIPACK). In using the packet they had a choice of media, learning methods, behavioral objectives and self tests.

The primary objective was fulfilled by first determining what should be taught in the Semiconductor I class. The materials were then developed for the SCIPACKs, and the twenty-nine subjects assigned randomly to the two groups.

In summary form, the hypotheses investigated were:

I. There is no significant difference between the two groups in immediate post-treatment achievement in:
   A. Electronic problem solving ability.
   B. Recall of electronic concepts and principles.
   C. A composite of A and B, or total scores.

II There is no significant difference between the two groups in four week retention of:
   A. Electronic problem solving ability.
   B. Recall of electronic concepts and principles.
   C. A composite of A and B, or total scores.

III. There is no significant interaction between the two groups and the tests given.

The data gathered during the experiment were statistically analyzed using first an analysis of variance for differences between the groups, differences among the tests, and for interaction between the tests and groups. Second, for a more precise measurement of any significant difference between the two groups, an analysis of covariance was applied, with the pretest scores as the covariate. In both cases there was insufficient evidence to reject any of the null hypotheses at the .05 level of significance.

Further analysis of the significant differences among the various tests and test portions was determined by the Newman-Keuls Sequential Range Test. The results of this analysis showed a significant performance score increase between the pretest and posttest by both groups and between the pretest and retention test by both groups, giving indications that learning had taken place. There was also a significant decrease between the posttest and retention test except for the problem-solving section, where there was a small non-significant increase, indicating some memory loss during the four week period.

Based on the findings of this exploration and the survey of the literature, it was recommended: (1) that desired *specific* objectives be determined for each technical curriculum, course by course; (2) that research effort be spent in developing individualized instructional methods and courses into continuous progress curricula; (3) that research be done to see what frequency of use and efficiency, various media have when the student has a free choice of media; (4) that comparative studies be made of lecture only and packaged instruction with no teacher contacts; (5) that comparative studies be performed of traditional versus SCIPACK without lecture; (6) that studies be done comparing the traditional with each element of the SCIPACK; and (7) that research be undertaken not as a comparative study but as to whether or not the various SCIPACK components accomplish the desired objectives.

The results of this experiment and the results of others reviewed during this investigation indicate that often no significant differences occur when comparing two methods of teaching. It was, therefore, further recommended that future comparisons of teaching methods be done, not only on the basis of student performance, but also include cost and the efficiency and attitudes of the students and teachers.

Finally, it was recommended that research be done to determine the specific characteristics of the ideal electronics technician.

Order No. 72-22,868, 172 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hopkins (Last name), Charles (First name), Oliver (Middle name)

Exact Title STATE-WIDE SYSTEM OF AREA VOCATIONAL-TECHNICAL TRAINING CENTERS FOR OKLAHOMA

Degree granted Ed.D., Date 1970 No. of pages in report 79

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Scope and Method of Study: The main objectives of this study were (1) to develop a linear programming model for state-wide planning of area vocational-technical training centers; (2) to determine the district boundaries for future area vocational-technical training centers; (3) to establish boundaries for existing area vocational-technical training centers; (4) to establish district boundaries so that an area vocational-technical training center is available to every student and adult in the state; and (5) to determine the minimum number of area vocational-technical training centers required to adequately serve the State of Oklahoma.

This study used linear programming to determine the optimum locations of area vocational-technical training centers. The State of Oklahoma was divided into five sections in order to make the study feasible. The valuation of independent school districts, eleventh and twelfth grade enrollments, and miles traveled by students were the restrictions placed on the study. Key locations were chosen as possible sites for area vocational-technical training centers. All the possible combinations of these locations were placed in the linear programming model and the optimum location of training centers was obtained for each section of the State of Oklahoma.

Findings and Conclusions: A total of thirty-four area vocational-technical training centers are recommended for the State of Oklahoma. From the thirty-four area center locations, twenty-six area vocational-technical training districts were proposed.

The procedure used for determining a state-wide system of area vocational-technical training centers can be used effectively by persons or agencies planning area vocational-technical training centers or to locate any service organization.

Planners of area vocational-technical training centers should give serious study to (1) where a district should be formed and (2) where an independent school district may join an existing district. The establishment of training centers should be viewed from a long-range outlook.

Order No. 71-11,169, 79 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hopper (Last name), Charles (First name), Hilton (Middle name)

Exact Title AN ANALYSIS AN PROJECTION OF FACTORS INFLUENCING SAFETY IN TECHNICAL EDUCATION PROGRAMS IN FLORIDA

Degree granted Ph.D., Date 1971 No. of pages in report 177

Granted by Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was concerned with the development of a model to assist educators in developing safety programs in the technical divisions of junior colleges in Florida. The study was based on a systematic solicitation and collation of informed judgments by recognized experts.

As a developmental research study to improve present practices and provide guidelines for future programs, the Delphi Technique as developed by the Rand Corporation, Santa Monica, California, was selected as one of the primary methods for conducting the study. This technique was linked with other management tools such as Program Evaluation Review Technique (PERT) Critical Path Method (CPM), network planning and computation of activity time estimates in the procedure-design.

The resultant model was developed by a panel of twelve experts consisting of diverse backgrounds in education, management, industry and governmental agencies. The Delphi Technique prevented professional status and authority from influencing decisions and judgments because the panel members were not in a face-to-face situation and did not necessarily have to know who the other members were. Personal committee meetings were eliminated by a program of sequential interrogations with information and feedback furnished to and from the panel.

Changes in science and technology have caused increasing specialization and complexity of skilled manpower needs. The demands of a rapidly changing and complex industrial environment and the requirements generated by the more sophisticated technical programs supportive to the professions creates both subtle and rapid changes in technical education. The needs for safety in the junior college programs are somewhat more complicated than ordinarily found in vocational education. There is a need for more theoretical knowledge and some application of management principles in the training environment for students with a potential for middle management positions.

The Delphi Technique almost eliminated personal biases and allowed the inclusion of significant items such as radiation protection, disaster and hurricane plans, as well as considering legislation resulting from new and emerging technological developments.

Although this study was not intended to be an extensive search of the literature, some unexpected spin-off benefits resulted in the location of more Florida documents on safety than originally anticipated. The model was supported with these and many U. S. Department of Labor safety publications.

Some of the recommendations suggest further research in technical education safety in Florida schools by state funding or graduate school research. Evaluative instruments are needed to determine the scope and effectiveness of pre-existing programs. Local in-service training programs were indicated by the findings of the study and these could be further expanded to include safety institute training at the university level.

Order No. 72-13,519, 177 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Houska (Last name), Joseph (First name), Thomas (Middle name)

Exact Title THE EFFICACY OF THE CLOZE PROCEDURE AS A READABILITY TOOL ON TECHNICAL CONTENT MATERIAL AS USED IN INDUSTRIAL EDUCATION AT THE HIGH SCHOOL LEVEL

Degree granted Ed.D., Date 1971 No. of pages in report 199

Granted by University of Illinois at Urbana-Champaign (Name of institution), Urbana, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose:

To ascertain the efficacy of the Cloze Procedure as a readability tool on technical content material.

Procedure:

Nine technical content passages (three from each field) were drawn from the automotive, woods, and electronics industrial education fields. Each passage was approximately 350 words in length. An assessment of readability of each passage was made by use of the Flesch Reading Ease formula. Then, by manipulation of the two factors of the Flesch formula, the three passages of each technical field were re-written to 7th, 10th, and 13th grade levels of readability. A cloze test and a 22-item comprehension test was developed over each passage. The cloze test was of the every 5th word deletion type while the 22-item comprehension test consisted of four measures of specific comprehension skill, i.e., meaning of technical and non-technical vocabularies, recognition of factual statements, and relationships.

The subjects (N=99) were obtained from the larger industrial education population (N=223) on the basis of their completing all nine cloze and comprehension tests and having available standardized measures of IQ and reading achievement. A t test between means of the sample population and the larger population, on IQ and reading achievement test scores, indicated the study population to be representative of the larger population. Furthermore, on the basis of the standardized reading achievement scores, the sample population was divided into three groups of high, medium, and low in reading ability.

The administration of the tests was conducted in the regular classroom meeting. The cloze test was presented first, before the subjects had read the passage. Eleven days later, the subjects read each passage and responded to the 22-item comprehension test over the passage. Analysis of the hypotheses of this study was based on the results of these two tests.

Findings:

Split-half test reliabilities were computed for each of the nine comprehension and cloze tests, and when corrected for attenuation by the Spearman-Brown Prophecy formula, yielded reliabilities from .58 to .88 for the comprehension tests and .73 to .92 for the cloze tests. Pearson r correlation coefficients were computed between cloze and comprehension tests over the same technical content passage (r = .3[illegible] to .609, corrected for attenuation); between cloze tests and measures of specific comprehension skills (r = .115 to .497); and between cloze tests and IQ (r = .29 to .52) and cloze tests and reading achievement (r = .27 to .57). All were significant at the .05 level.

Spearman rho rank order correlation coefficients were computed between comprehension and cloze tests rank ordering of the nine passages and across levels of students' reading ability (rhos = .86 to .98); between cloze test and Flesch R.E. formula rank ordering of the three passages of each technical field, (rhos = .50 to 1.00) and between the comprehension and cloze tests rank ordering of the three different technical fields used in this study (rho = 1.00). A simple one-way analysis test, followed by a Newman-Keuls test, was computed across levels of reading ability for each cloze test to verify if significant differences existed in the rank ordering process by the different ability groups. All F ratios were significant at the .05 level.

Conclusions:

The Cloze Procedure, when used on technical content materials, was demonstrated to:

1. identify the relative readabilities of the passages similar to the comprehension test technique;
2. identify the relative readabilities of the passages similar to the Flesch Reading Ease formula;
3. discriminate between readers of varying reading abilities;
4. identify which technical content fields were relatively more readable;
5. relate, with low correlations, with standardized measures of students' abilities.

Order No. 72-6937, 199 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Huber (Last name), Paul (First name), Martin (Middle name)

Exact Title CRITICAL REQUIREMENTS FOR THE COORDINATOR IN COLLEGE COOPERATIVE EDUCATION PROGRAMS: A SYNTHESIS OF THE PERCEPTIONS OF COORDINATORS IN HIGHER EDUCATION AND INDUSTRY

Degree granted Ed.D., Date 1971 No. of pages in report 168

Granted by Wayne State University (Name of institution), Detroit, Michigan (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

This study determined certain critical requirements exhibited in successful performance by college coordinators in comparative education as perceived by themselves and their counterparts in industry, industrial coordinators. An adaption of the critical incident research technique was used to collect and analyse the observations.

Critical incidents concerning college coordinators were reported by eighty college coordinators and eighty-four industrial coordinators from fifty-three schools and eighty industries which had cooperative education programs established prior to 1963. A total of 159 usable critical incidents were reported containing 345 behaviors: 197 from college coordinators, and 148 from industrial coordinators.

Behaviors reported by college coordinators were classified into four categories of college coordinator responsibilities: (I) Administration and Supervision of the Program; (II) Coordination; (III) Personal and Professional Relationships; (IV) Guidance and Counseling. The categories for behaviors reported by the industrial coordinators were the same.

Behaviors in each category were examined for similarity, similars were grouped, and summary statements, called critical requirements, written to reflect the behaviors comprising each group. Each category of requirements was subsequently divided into smaller groupings containing similar requirements, and headings written for each sub-category.

The two lists of critical requirements were synthesized in a list containing sixty-five critical requirements under the following categories and sub-categories:

Category I. Administration and Supervision of the Program: A. Provides Administrative Leadership. B. Works Toward Continuous Development and Improvement of the Program. C. Judiciously Places Students in Training Assignments. D. Endeavors to Maintain Student Job Continuity. E. Maintains Control of the Program.

Category II. Coordination: A. Maintains Efficiency of the Program Through the Industrial Coordinator. B. Establishes Communication Within the Company Structure. C. Makes Particular Effort to Solve Special Problems. D. Keeps School Administration Current On Program.

Category III. Personal and Professional Relationships: A. Relations with Faculty and Administration. B. Relations with Students. C. Relations with Employers. D. Relations with Parents. E. Personal Characteristics.

Category IV. Guidance and Counseling: A. Establishes Rapport with Students. B. Works Toward Student Recognition of Problems. C. Strives for Improvement of Student Performance on the Job. D. Assists Students in Clarifying Career Plans. E. Refers Students with Special Problems to Professional Counselors.

The chi-square statistical technique was used to determine significant relationships between the proportions of effective and ineffective behaviors reported and the observer groups; and whether the age, experience in cooperative education, number of students supervised, or adequacy of training of the observers had any significance in the proportions of effective and ineffective behaviors reported. Null hypotheses were accepted or rejected at the .01 level of significance.

Significant differences were found in the proportions of behaviors reported by the observer groups. Industrial coordinators placed more emphasis on administrative and supervisory aspects of the college coordinator's responsibilities, whereas college coordinators emphasised activities concerned with personal and professional relationships, and guidance and counseling. Industrial coordinators viewed the performance of the college coordinator as less effective than did college coordinators. The same view was held when comparing coordinator groups of similar age, training, and experience in cooperative education.

Both groups of coordinators viewed the performance of the college coordinator in guidance and counseling as very effective.

The college coordinator was highly student oriented in terms of the bent of his behaviors and activities.

Consideration should be given to using the critical requirements in establishing college coordinator job descriptions, evaluating college coordinators and cooperative education programs, and planning and effecting training and work shops for college coordinators. The critical requirements should be used as a point of departure for additional studies to correlate the performance of identified college coordinators with certain personal and professional characteristics.

Order No. 72-14,575, 168 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hudson, Donald, W.
(Last name) (First name) (Middle name)

Exact Title EFFECT OF CONTIGUITY ON INFORMATIONAL ACHIEVEMENT AND PSYCHOMOTOR PERFORMANCE

Degree granted Ed.D., Date 1972 No. of pages in report 92

Granted by University of Missouri-Columbia Columbia, Missouri
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To ascertain the relative effects of traditional contiguity, varied contiguity and integrated contiguity on the achievement of informational content and the performance of a psychomotor task.

Source of data and method of study·

The population for this study consisted of 73 students from grades 5, 6, and 7 of which 60 students were randomly selected from the upper and lower 40% of the I.Q. scores. This investigation was conducted using a randomized block design wherein the independent variable was the type of contiguity provided in relating informational content and psychomotor activity. The dependent variables were informational achievement as indicated by a cognitive test and psychomotor performance measured by evaluating a completed psychomotor task.

Findings and Conclusions:

In view of the findin g of a significant difference among the mean scores of informational achievement, it was concluded that the achievement of students exposed to traditional contiguity or varied contiguity will be higher than the achievement of students exposed to integrated contiguity. Educators can expect students of high mental ability to have a higher level of informational achievement that students of low mental ability.

Since there were no significant differences among treatment mean scores for psychomotor performance, it was concluded that psychomotor performance is not effected by contiguity. Educators can expect no significant difference in psychomotor performance between students of high mental ability and low mental ability.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Hulle (Last name), William (First name), A. (Middle name)

Exact Title DEVELOPMENT OF AN OCCUPATIONAL COMPETENCY EXAMINATION FOR STAMPING-DIE DESIGNERS

Degree granted ED.D., Date 1972 No. of pages in report 339

Granted by Wayne State University (Name of institution), Detroit, Michigan (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. (X)

Purpose of Study

The development of an occupational competency examination to verify and validate the cognitive and psychomotor learning of prospective industrial-vocational teachers with occupational specialization in stamping-die design.

Source of data and method of study:

The proposed test content was derived from stamping-die design text books, automobile manufacturers' stamping-die design manuals, manufacturers' catalogues, handbooks, and similar material. The proposed test comtent was then submitted to, revised by, and approved bya jury of stamping-die design experts, with master-level competency, The examination was prepared in three successive drafts. The first draft was prepared from the "List of Approved Test Content." The examination format was in general comformance to recommendations of the National Occupational Competency Testing Project, Rutgers University (Dr. C. Thomas Olivo and Adolf Panitz). The first draft was administered to a novice-level test population. The second draft was prepared from test items selected from the novice-level examination. The population' stamping-die designers (three levels), industrial-mechanical draftsmen, and stamping-diemakers. The final draft was prepared from test items selected from the journeyman-level examination. The results of the first and second draft were analyzed through the use of a computer program.

Findings and Conclusions:

Within the limitations noted, the "Stamping-Die Design Occupational Competency Examination" Versified and validated occupational competency. The data identified generally the stamping-die design occupational competency of the journeyman-level test population. The test-data analysis identified dichotomous areas of learning specific to stamping-die design: knowledge and skills specific to industrial-mechanical drafting and knowledge specific to pressworking sheet metal. The test score analysis data indicated a satisfactory level of test reliability. The test-design methodology offers promise for the development of competency examinations for other specialized occupations.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Hunter (Last name), Elvin (First name), Max (Middle name)

Exact Title NEED FOR, INTEREST IN, AND MEANS OF SUPPORTING AN AREA VOCATIONAL SCHOOL TO SERVE MILLER, MONTEAU, AND MORGAN COUNTIES, MISSOURI

Degree granted Ed.D., Date 1963 No. of pages in report 210

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain whether or not a need for an Area Vocational School did exist, how much interest there was in such a school, and how it could be supported.

Source of data and method of study:

Data for the study were obtained from 1030 informational forms returned by former students of 9 high school, by 304 forms returned by voters, and from records reports of the cooperating schools, and the state department of education.

Findings and Conclusions:

1. Unless steps are taken to provide additional educational and occupational opportunities within the Tri-County area. large numbers of youth will continue to leave the area.
2. Since many students terminate their education at the secondary level, if the schools are to upgrade the occupational life of their students, improved programs of vocational education must be provided.
3. Since the former students desire vocational training with emphasis on courses in trades and industries, technical educastion and cooperative occupational education, the Tri-County school need to bring their vocational education programs into line with the needs and interests of their students.
4. It is apparent that better vocational guidance is needed in the Tri-County area schools.
5. Federal, state, and local funds, plus student fees, should be used to finance an Area Vocational School.
6. From the information compiled in this study, it seems evident that there does exist among former students and voters of this three-county area, sufficient need for, and interest in, an Area Vocational School to warrant serious consideration of the establishment of such a school and since a majority of the respondents expressed a willingness to support such an educational undertaking, it appears that with the assistance of federal and state funds to supplement local sources of revenue, the Tri-County area should be financially able to support an Area Vocational School.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Illinik, Robert, Louis
(Last name) (First name) (Middle name)

Exact Title THE ROLE OF PRODUCTION METHODS IN THE ORGANIZATION OF MACHINE SHOP INSTRUCTION IN TURKEY

Degree granted Ed.D., Date 1971 No. of pages in report 391

Granted by University of California Los Angeles, California
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem of this study is to determine the relative effectiveness for training attendant to the manufacture of usable items by students in Turkish machine shop classes and to establish guidelines for organization of live work experience in the light of:

1. Accomplishments and shortcomings of traditional Turkish methods of organization.
2. Practices of skill development training in schools and industries of five Western European countries.
3. Development directions of production-worker training in other nations.

Methodology of the study centered in the use of a set of questions arising out of a two-year assignment working with Turkish educators in Turkey. Observations and interviews within Turkey and in Austria, Greece, Italy, Switzerland and West Germany were supplemented by interviews in Europe with personnel of ILO, UNESCO, and OECD. The study uses the descriptive-survey format emphasizing data procured by interview, questionnaires and review of available records.

Findings. The use of production as a method of organization of machine shop instruction has been in Turkey an especially appropriate method. The machine shop instruction program has materially affected the development of Turkish industry. Production in the schools per se has provided more than one-fifth of the current instructional capacity while contributing substantially to the Turkish national product and especially to the needs of the Ministry of Education for school and instruction equipment. Continuance of the use of production as a method for organization of instruction should be predicated on establishing and maintaining technological sophistication appropriate to national objectives for the manufacturing sector and population needs for skill training and retraining.

Throughout the visited areas of Western Europe, school training is increasingly equated with apprenticeship as a means of developing skilled workers. There is a growing emphasis on open-ended training with education and training as recurring processes throughout a worker's lifetime.

The ever present problems of conservation of materials and disposal of products manufactured during training can be solved by techniques used in Switzerland and codified in Turkey by means of the Revolving Fund Law. Such procedures stress the importance of school contributions to Gross National Product while helping to eliminate waste and to reduce the cost of program operation.

Industrial training in the visited countries is increasingly adopting school-oriented methodology. Trainees are assigned very early to productive use of their learned skills, followed by more advanced training. Pyramiding of skill instruction with skill use is a feature of industrial training which has implications for machine shop instruction everywhere.

Order No. 72-2833, 391 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ingram (Last name), Maurice (First name), Dean (Middle name)

Exact Title A RESOURCE RESEARCH IN INTEGRATED CIRCUITS WITH EMPHASIS ON CURRICULUM DEVELOPMENT FOR INDUSTRIAL ARTS

Degree granted Ed.D., Date 1971 No. of pages in report 215

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this research was to identify a body of knowledge which could be utilized for curriculum materials about integrated circuits for high school industrial arts classes. The research was approached through the following objectives: (1) to present a historical perspective of integrated circuits; (2) to establish the effect which integrated circuit technology should have on the high school electronics curriculum; (3) to develop instructional materials for high school industrial arts classes which will reflect current technology in the area of integrated circuits; and (4) to project recommended curriculum changes to the future.

The survey method was used to obtain information from manufacturers to establish: (1) the relative industrial value of various types of active devices and their associated circuits in 1971 and 1976; (2) the recommended distribution of instructional time which should be devoted to instructional areas; and (3) the recommended curriculum content covering integrated circuits. The instrument was developed from a review of literature and refined through the use of a jury.

A historical perspective covering the development of integrated circuits was written, based on bibliographical methods. Instructional materials were developed which could be used to introduce integrated circuits to high school electronics classes and were based on the outcome of the data collected in this study.

A review of publications revealed that broad-based manufacturers of semiconductors were the logical source for obtaining the desired information. A preliminary survey determined that 43 of the 51 identified firms agreed to participate in the study. The survey netted 39 usable forms. The data obtained from the questionnaire were tallied and reported in the form of means, percentages, and standard deviations. Graphical comparisons were made to determine which items were most important to curriculum planning.

Conclusions were made in accordance with the assumptions and limitations stated for the study. The following conclusions were made with reference to the second-year electronics course in industrial arts [illegible]:

1. The percentage of the total instructional time oriented toward integrated circuitry should be as follows: (a) digital circuits, 21 per cent, (b) linear circuits, 19 per cent; and (c) fabrication, 10 per cent.
2. Emphasis should be placed on monolithic structures.
3. Diffusion, evaporative, photolithographic, component-construction, packaging, and circuit-layout were the most important processes to instructional content for an understanding of integrated circuits.
4. Gates and flip-flops were the most representative of digital integrated circuitry for instructional content. Transistor-transistor logic is the most used configuration for digital circuits.
5. Medium and large-scale integration should be introduced in the curriculum.
6. Operational amplifiers and differential amplifiers were the most representative of linear integrated circuitry for instructional content.
7. The percentage of the total instructional time oriented toward discrete circuitry should be as follows: 34 per cent, transistors, and 16 per cent, tubes.

The following conclusions were made with reference to the second-year electronics course in industrial arts for the near future.

1. Instructional time devoted to linear and digital circuits should increase. Medium and large-scale integration concepts require additional emphasis.
2. Low-power junction transistors technology should become less important while MOS field-effect transistor technology should greatly increase in importance.
3. Power transistors should increase in their relative importance.
4. Power tubes, cathode-ray tubes, and special-purpose tubes should remain in the curriculum.

A priority system was used in the study to provide an additional breakdown for instructional emphasis.

The following recommendations are cited:

1. Instruction in tube technology should be limited to functional aspects rather than design aspects.
2. Instruction in transistor technology and integrated circuit technology should be mutually overlapping and interacting.
3. A similar study should be conducted in four years.
4. A similar study should be developed with the objectives based on teacher education.
5. A complete set of curriculum materials should be developed and tested for the integrated circuitry portion of a high school level and a college level course.

Order No. 72-5730, 215 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ingram (Last name) Theodore (First name) , (Middle name)

Exact Title A DEMONSTRATION AND EVALUATION OF AN UNDERDEVELOPED HUMAN RESOURCES PROJECT WITH IMPLICATIONS FOR STATEWIDE MANPOWER PLANNING

Degree granted E.D..D. , Date 1971 No. of pages in report 150

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Scope of Study. The primary purpose of this study was to document and evaluate the methods used in a project which attempted to identify underdeveloped human resources in the metropolitan area of Tulsa, Oklahoma. The term "underdeveloped human resources" was defined as those persons who were underutilized or disadvantaged because of geography, age, sex, race, and low levels of skill or education. On the basis of the findings, implications for statewide manpower planning were listed in the final chapter.

The study analyzed data on respondents in nine Oklahoma counties which was gathered through questionnaires. Personal interviews of a random sample of questionnaire respondents were utilized as a bias check. The instruments were designed to seek information about the personal, socio-economic, and employment status of respondents. Questions concerning the vocational-technical background of respondents were also posed. There were five thousand and forty-five respondents in the study.

Findings and Conclusions: The results of the study were supported by the "review of literature." An analysis of the percentage distribution of data led to these findings: Young, female, and minority group respondents were more likely to be unemployed and/or underemployed because of low levels of skill or a lack of education. Although the methodology used failed to identify a large percentage of the Negro population, major differences were found between the employment status and weekly income of Negro and white respondents. In each case a higher percentage of Negroes were unemployed and earned considerably less per week than the white respondents. Of the 5,045 respondents, 40.2 percent did not have any type of job training; however, sixty-eight percent indicated a willingness to take vocational-technical training. Thirty-eight percent of the 5,045 respondents were unemployed. The major conclusion from this study was that the methodology was effective for identifying underdeveloped human resources.

Order No. 72-21,900, 150 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Israel (Last name) Everett (First name), N. (Middle name)

Exact Title THE ROLE OF NON-VERBAL AND VERBAL COMMUNICATION IN STUDENTS' ABSTRACT UNDERSTANDING OF A TECHNOLOGICAL CONCEPT IN JUNIOR AND SENIOR HIGH

Degree granted Ed.D., Date 1972 No. of pages in report 461

Granted by West Virginia Univeristy (Name of institution) Morgantown, West Virginia (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To determine if the verbal instructional medium complementing the non-verbal instructional medium would result in students developing a higher level of abstract understanding than the use of the verbal instructional medium alone or the verbal instructional medium supplementing the non-verbal medium.

Source of data and method of study·

Study involved (1) selecting a technical concept;(2) developing a subordinate hierarchy, (3) writing test materials to measure abstract learning, (4) producing video-taped lessons, (5) determining test reliability, (6) identifying the sample, (7) collecting the data and (8) analyzing the data.

Findings and Conclusions·

(1) The verbal medium complementing the non-verbal lesson resulted in students acquiring the largest abstract understanding of a technical principle (forming of plastics) and (2) intellectual maturation has an effect on students' abilities to develop an abstract understanding of the technical principle.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jabbari, Ebrahim, G.
(Last name) (First name) (Middle name)

Exact Title A PLAN OF TRADE AND INDUSTRIAL EDUCATION FOR IRAN BASED ON TRADE AND INDUSTRIAL EDUCATION PROGRAMS IN THE UNITED STATES

Degree granted Ph.D., Date 1972 No. of pages in report 218

Granted by University of Missouri-Columbia, Columbia, Missouri
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine the need for a trade and industrial education program in Iran; To design a functional program to meet the needs for training skilled manpower for Iran; and To make suggestions for the implementation of a trade and industrial education program in the educational system of Iran.

Source of data and method of study

Data for the study were obtained through: 1) questionnaires responded to by selected trade and industrial education specialists in the United States; 2) available literature concerning trade and industrial education programs in the United States; 3) availabel literature and statistical information concerning Iranian general, vocational and technical education; and 4) surveys and reports published by UNESCO.

Findings and Conclusions:

1. That it is necessary to plan trade and industrial education programs to solve the needs for skilled manpower and the educational needs of individuals in Iran.
2. That selected procedures and characteristics utilized by trade and industrial education in the United States are applicable for establishing a trade and industrial education program for Iran.
3. Adjustments need to be made so that trade and industrial education programs are not segregated, bur offered at each level of education in Iran.
4. Guidance and counseling services need to be extended from the junior high through all educational levels so the students will be directed into the programs best suited to their needs and interests.
5. The proposed model plan may be used as a guide to implement the curriculum as set forth in the educational reform to serve the students with a broad range of interests and abilities.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jaeschke (Last name), Donald (First name), Paul (Middle name)

Exact Title A COMPARATIVE ANALYSIS OF PLANNING PROCEDURES EXERCISED BY ADULT AND VOCATIONAL EDUCATORS

Degree granted Ph.D., Date 1971 No. of pages in report 178

Granted by Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

A comparative technique based upon the responses of adult and vocational educators in Florida was employed to study the differences of the perceived importance of selected program planning procedures. The importance of implementing actions and the sequence of these steps were also analyzed. Base line data of common and unique elements in program planning of the two educational agencies responsible for helping adults in their career development were determined.

Postulate

It was postulated that individuals would react differently to program management decisions as a function of their background and experiences. The adult educator would thus be expected to respond different in rating the importance of planning procedures from the vocational educators and teachers different from supervisors.

Subjects

The sample consisted of all of the vocational supervisors employed by county school systems in Florida, and one randomly selected vocational teacher under his supervision. A like number of randomly selected adult supervisors and teachers completed the gross sample. Thus 360 individuals were contacted. The net sample (267) included 62 second level adult supervisors; adult teachers, 83; vocational supervisors, 62; vocational teachers, 60.

First and second level personnel in public schools, i.e., teachers working face-to-face with students and their immediate supervisors, respectively, in twenty-one population centers within six major geographic areas in Florida constituted the population.

Instrument

The instrument employed was an adaptation of that developed by Henry G. Brady. Fourteen program planning procedures and 5 implementing steps were identified. Respondents rated the degree of importance of each procedure and implementing action as well as sequence ordered the five steps or actions.

Analysis

Chi-square statistics were used to determine significant associations among the perceptions of adult supervisors and teachers when compared with vocational supervisors and teachers. To analyze the sequence of the steps important to implementing each procedure, the Kendall Rank Correlation test was used. As a measure of interjudge reliability, the Kendall Coefficient of Concordance W was computed and analyzed.

Results

The data showed no significant association among the groups regarding twelve of the fourteen procedures. Two procedures, conduct the program and respond to urgent program requests in which time and effort were limited were rated higher by adult educators.

Of the 70 implementing actions, fourteen were valued significantly different. In ten of the fourteen, or 71 percent, the teacher rated the step lower in importance; the supervisor higher. In three (21%) there were differences based upon job classification. Two of the steps reflected a greater concern for the individual student in the planning process by adult educators. Vocational educators gave greater importance to establishing and maintaining close personal associations with community leaders and groups.

Data gained from sequence ordering offer base line measures useful to further research. This study was viewed as an essential first step in answering the question, "Whose responsibility is career education programming for the adult?"

Order No. 72-16,589, 178 pages.

SOURCE SELECTION FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author James (Last name), William (First name), Edward (Middle name)

Exact Title TECHNOLOGICAL SUBJECTS INSTRUCTORS IN BACCALAUREATE PROGRAMS OF INDUSTRIAL TECHNOLOGY

Degree granted Ed.D., Date 1971 No. of pages in report 148

Granted by Indiana University (Name of institution), Bloomington, Indiana (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Background of the Study

The baccalaureate program in industrial technology has been a significant development in technological education in America within the past two decades. Evolving almost entirely out of industrial teacher education programs offered in teachers' colleges, many of which have emerged within this same period of time to rank among the nation's major institutions of higher learning, these new programs are currently being offered in more than 70 colleges and universities.

The rapid expansion of these programs has paralleled and is unquestionably a direct result of the tremendous technological developments since World War II. Continuing and even more rapid technological advancements will almost certainly heighten the need for and lead to further development of these programs. Such development deserves to be based on the most careful consideration of all of the factors essential to establishing and maintaining the highest quality programs possible, among the most critical of which factors are those related to the faculties of the programs.

Statement of the Problem

The study was an investigation of the characteristics and qualifications of technological subjects instructors and certain factors related to their positions in baccalaureate programs of industrial technology offered in institutions of higher learning in the United States. More specifically, information concerning these instructors was acquired and analyzed with reference to: (1) their teaching positions, (2) their academic backgrounds, (3) their occupational and other experiences related to their technological fields, (4) their teaching experience, (5) factors they considered desirable and factors they considered undesirable about their positions, (6) their job mobility, and (7) factors involved in their recruitment, placement, and retention in their present positions.

Procedure

Colleges and universities which offer baccalaureate programs in industrial technology were identified from authoritative sources. Letters were sent to chairmen or heads of industrial technology or other departments in which industrial technology programs might be offered asking them to supply the names of each of their full-time teachers at least half of whose assignment was teaching technological subjects to industrial technology students. A data-collection instrument was mailed to those instructors and the data obtained from the information forms which were returned by them were analyzed, using frequency distributions, percentages, rank order and quantitative summary.

Conclusions

Within the limitations of the study, the following conclusions were made:

1. The embryo stage of many baccalaureate programs of industrial technology is reflected from the wide-ranging differences existing among them, many of which differences are the consequence of the evolvement of these programs from industrial teacher education programs. On the other hand, other evidence points to at least the beginning of independent status of many of the programs.

2. A wide range of academic qualifications exists among instructors. There is evidence of some selectivity of industrial teacher education instructors who have been assigned to teach in baccalaureate programs of industrial technology.

3. There is also a wide range of both applied experience in their technological fields and teaching experience among instructors.

4. The technological subjects instructors are generally well-satisfied with all aspects of their positions.

5. The typical instructor is in his early middle years with an established family and nearly completed academic qualifications, four or more years of tenure, and has remained in the same geographical area in which he was reared, obtained his education and first position; therefore, he probably will remain in his present position, or the number and distance of any moves he makes will be very limited.

6. No formal method of communicating position openings to potential applicants reaches more than a minority of those applicants, however, the lack of such methods does not appear to be any great obstacle to the recruitment of applicants.

Order No. 72-1553, 148 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Janeczko, Robert, John
(Last name) (First name) (Middle name)

Exact Title THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS

Degree granted Ed.D., Date 1971 No. of pages in report 189

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose. The purpose of this study was to ascertain the relative effects of student exposure to instructional objectives upon student self-evaluation of psychomotor activities in a college-level power mechanics course. Further purposes were to ascertain the effects of instructional objectives upon laboratory practice time, achievement test time and student attitudes.

Method of Research. A randomized post-test only, control-experimental group design was utilized in conducting this experiment. The treatments involved two different approaches to the statement of objectives of psychomotor performance in power mechanics. Four instructional learning packages related to automotive braking systems were constructed. These learning packages were identical in composition, layout, and illustrations. The only difference was in the statement of the objectives. One-half of the students received instructional objectives which contained the terminal behavior, a list of "givens" or conditions, and the criteria for evaluation. The remaining one-half received general objectives which were less precisely written statements of instructional goals.

Findings. The directional hypotheses indicating that the mean scores on tests of psychomotor achievement, laboratory practice time, and student attitude of the instructional objective group would be less than or equal to the mean scores of the general objective group were not rejected.

Hypotheses stating that the correlations between students' self-evaluation and instructors' evaluation of psychomotor performance of the instructional objective group would be less than or equal to the general objective group were not rejected based on the results of the Fisher Z transformation for significant differences between correlations.

The hypothesis which deals with the amount of time necessary to complete the safety switch test was rejected. The results of the t-test for differences between means revealed that the instructional objective group completed the safety switch test in significantly less time than the general objective group. Hypotheses regarding the amount of time necessary to complete the remaining three achievement tests were not rejected.

Conclusions. Since eleven of seventeen hypotheses tested favored the instructional objective group, it may be concluded that students who have prior knowledge of instructional objectives can be expected to achieve at a higher level than students who have prior knowledge of general objectives.

Inasmuch as there were no significant differences between treatment groups in their ability to evaluate their own psychomotor performance, neither of the two approaches to stating objectives appears to be more effective than the other in terms of the self-evaluation variable. However, it may be further concluded that there will be no detrimental effects on self-evaluation of psychomotor achievement by the inclusion of either general or instructional objectives in individualized laboratory instructional materials in power mechanics.

Since students who experienced instructional objectives were not significantly faster in practicing in the laboratory than students who experienced general objectives, this investigation failed to reveal a significantly superior approach to reducing the amount of student laboratory practice time in power mechanics.

The treatment group exposed to instructional objectives evidenced a significantly lower mean test time than the group exposed to general objectives. Therefore, it is concluded that exposure to instructional objectives does result in the reduction of the amount of student psychomotor test time in power mechanics.

Since both treatments proved to be effective in promoting a positive student attitude, it may be concluded that the inclusion of a statement of objectives, either general or instructional, will contribute to a positive student attitude toward individualized laboratory instructional materials in power mechanics.

Order No. 72-10,556, 189 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jenkins, Joseph, Ralph
(Last name) (First name) (Middle name)

Exact Title A STUDY TO DETERMINE THE TYPE OF PROFESSIONAL COURSES WHICH VOCATIONAL-TECHNICAL SHOP TEACHERS FIND MOST HELPFUL

Degree granted Ed.D., Date 1971 No. of pages in report 141

Granted by University of Alabama University, Alabama
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The study was concerned with identifying professional courses that are most helpful to vocational-technical teachers for classroom and laboratory teaching.

Purpose of the Study

The purposes of the study were:

1. To determine the degree to which professional—trades and industrial education courses were perceived as being helpful by Alabama day-trade teachers.
2. To determine relationships which existed between certain variables such as:
   a. The teacher educational background, and the perceived course value.
   b. Opinion towards college credits versus industrial experiences.
   c. Actual years of teaching the trade.
   d. Kinds of certificates held.

Methods and Procedures

The sample for the study was Alabama day-trade teachers who were enrolled in teacher trainer centers in Huntsville, Gadsden, Montgomery, and Birmingham, Alabama.

Data were gathered by questionnaires. A pilot study composed of seven in-service teachers with experience in vocational-industrial education was conducted in order to validate the data-gathering instrument.

Seventy two questionnaires were mailed to Alabama day-trade teachers, with a cover letter attached which explained their intent. The core of the questionnaires requested respondents to rate the courses in an eleven course Trades and Industrial Education curriculum in order of their importance to them for teaching their classroom and shop courses.

Sixty or 83.33 percent of the questionnaires were returned. Analysis and transcription of the data are presented in tabular forms of frequency distributions, percentages, and Chi-square tests.

A set of criteria which proposes to be indicative of successful teacher trainer education, and vocational-technical education programs is presented.

Conclusions

From the evidence of this study, it was concluded that, while there are several avenues through which a person may become a teacher of trades and industrial education, certification requirements tend to put emphasis on demonstrated occupational competence as opposed to college degrees. Fifty per cent of the respondents held no degree.

The course found to be "most helpful" was Job Analysis with a total frequency of 56 or 93.33 per cent of the sample population. The course found to be of least importance was Seminar in Vocational Education with a total frequency of 29 or 48.33 per cent of population. Table 25 of the study presents these data.

Recommendations

On the basis of findings of the study, certain specific and general recommendations follow.

Specific

1. That consideration be given to such courses as psychology, audio media, the teaching of related technical information, counseling and guidance, health, and shop management and supervision.
2. The content of the courses—Evaluation, and Seminar in Vocational Education be re-evaluated so as to give teachers more help.
3. That Directed Teaching for in-service vocational-technical teachers be taken out of the curriculum.

General

1. Vocational teachers should be encouraged to become more professional in their attitudes and become aware of the part they play in the total educational process.
2. Vocational teachers should find new means to evaluate their own teaching and programs.
3. Team or group co-operative activity appears to have relevance to vocational-technical teaching and might be a productive means of achieving advances. The pooling of this knowledge, experience and special ability of members of a group could result in more creative and qualitative action.

Order No. 72-8441, 141 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jansen (Last name), Duane (First name), G. (Middle name)

Exact Title AN ANALYSIS OF COMMUNICATION FLOW BETWEEN STATE AND LOCAL ADMINISTRATORS OF VOCATIONAL EDUCATION

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To determine the role that communication plays in the planning and controlling processes of vocational education at the state and local levels of administration.

Source of data and method of study:

Forty-seven state directors responded to a preliminary questionnaire with data which was used to describe the "state of the art" of communication between state vocational education divisions and local administrators of vocational programs. A second questionnaire was sent to the five selected state directors to collect data which was used to measure the effect of the perceived organizational behavior patterns upon the flow of communications. A third questionnaire, which contained selected items from the first two questionnaires, was mailed to a random sample of local administrators of vocational programs in the five selected states. A ninety-six percent return was received.

Findings and Conclusions:

The statistical analysis of the data revealed that numerous factors contribute to the successful outcome of the communication process. The variation of opinion between groups did not provide conclusive evidence that there are significant differences in the perceived evvedtiveness of formal communication as reported by state directors and local administrators. There was no significant difference in the perceived communication needs of local administrators as reported by the state vocational education divisions and local administrators. The morphogenic-morphostatic orientation of the state vocational education division was perceived to be slightly morphogenic by both groups of administrators. The profile of the responses of the local administrators was slightly below the profile for the state directors. The data revealed that there is a positive relationship between the type of organizational structure of a state vocational education division and the resulting effectiveness of the communication process.

SOURCE SHEET FOR SUBMITTAL TO THE AIAA INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Johnson (Last name), Duane (First name), Allan (Middle name)

Exact Title ORGANIZATION, ADMINISTRATION, AND OPERATION OF AREA VOCATIONAL TECHNICAL SCHOOLS IN SOUTH DAKOTA, 1963-1971

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of South Dakota (Name of institution), Vermillion, South Dakota (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To identify and compare area vocational-technical school characteristics concerning the organizational structure, administrative positions, instructional programs, course offerings, and budgeted expenditures at the local level and the organizational structure and administrative positions at the state level in South Dakota for school years 1963-64 through 1970-71.

Source of data and method of study:

An interview techniqueand a questionnaire were developed and utilized in this investigation. Interviews were conducted with five area vocational-technical school directors and the State Director of Vocational Education utilizing the guide. The questionnaire was introduced in discussion and left with participants for completion and return by mail.

Federal and state statutes were reviewed to determine the legal basis and requirements for area vocational-technical education in South Dakota. Area vocational-technical school catalogs and bulletins were utilized to identify programs and course offering for each school.

Findings and Conclusions:

The South Dakota State Board for Vocational Education designated six areas in 1965 and approved construction of an area vocational-technical school in five areas.

Written job descriptions for administrative positions within the State Division of Vocational Education were available according to job titles but were not available in the area vocational-technical schools.

School districts provided 53 percent and the federal government 47 percent of the funds for area vocational-technical school construction during the period covered.

Federal aid to vocational education through the Vocational Education Act of 1963 and the Vocational Amendments of 1968 has supplemented state and local financial efforts.

Regional boundaries appeared to limit numbers and distribute locations of area vocational-technical schools within the state.

State level administrative job titles were appropriately described in writing.

Administrative positions at the local level were not well defined since written descriptions were not available.

The concept of area vocational-technical educational programs for secondary school students was not supported by existing provisions made.

Attendance areas were not coterminous with established service boundaries at the post-secondary or secondary level.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Johnson (Last name), Ira (First name), H. (Middle name)

Exact Title THE LOST WAX PROCESS AND ITS USE IN INDUSTRIAL ARTS

Degree granted Ed.D., Date 1955 No. of pages in report 153

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is twofold: (1) to investigate the procedural steps of the lost wax process and write an instructional manual for industrial arts use; and (2) to provide the author with experience in the experimental method of solving an industrial arts problem.

The study is divided into three parts. Part One – Research Study – describes the problem, states the purposes, explains the procedures, and tells how the instructional material was compiled. Part Two – Instructional Manual – contains the descriptive and pictorial material and other related aids under the following chapter headings: (1) Statement to Industrial Arts Teachers; (2) Development of the Lost Wax Process; (3) The Lost Wax Process; (4) Place in Industrial Arts; (5) Master Model Procurement; (6) Rubber Mold Fabrication; (7) Wax Pattern Fabrication; (8) Investment; (9) Wax Removal; (10) Metal Casting; (11) Investment Removal; (12) Glossary; and (13) Sources of Supply. Part Three – Concluding Statements – suggests additional needed research and expresses some significant trends.

The approach to the problem was made by an extensive survey of printed material, by visiting many appropriate industries in the central and eastern part of the United States, and by thorough experimentation in all of the procedural steps of the process.

An extensive bibliography provides a listing of available literature about the lost wax process. A selected bibliography is also provided since certain entries are denoted to indicate that they are especially pertinent for industrial arts use.

153 pages. $1.91. MicA 55-1373

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Johnson (Last name), Leonard (First name), Ross (Middle name)

Exact Title A COMPARATIVE INVESTIGATION OF ACHIEVEMENT MOTIVATION IN VOCATIONAL-TECHNICAL AND TRANSFER STUDENTS IN SELECTED TEXAS JUNIOR COLLEGES

Degree granted Ed.D., Date 1971 No. of pages in report 153

Granted by Baylor University (Name of institution), Waco, Texas (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

THE PROBLEM: The primary purpose of this study was to determine the differences between vocational-technical students and transfer students on levels of achievement and on selected personal, psychological, and motivational characteristics. The secondary purpose of the study was to validate an objective personality questionnaire designed to measure achievement motivation.

THE SAMPLE: The sample consisted of 100 vocational-technical and 100 transfer students enrolled in four Texas junior colleges during the 1970-71 academic year. Representative samples consisting of 25 vocational-technical students and 25 transfer students were selected on each campus.

THE PROCEDURE: Comparisons of vocational-technical and transfer students were made in relation to 21 variables. An achievement imagery and a total achievement motivation score were obtained through the presentation of four of McClelland's Thematic Apperception Test pictures (MCTAT). The objective instrument chosen to be validated was the Silver Personality Questionnaire (SPQ). Self-attitudes of the students were surveyed by the Brown-Holtzman Survey of Study Habits and Attitudes (SSHA). Comparisons of the scholastic aptitude of the two groups of students were accomplished by using the American College Test Standard Scores. Statistical analysis of the data was conducted by obtaining distributions, intercorrelation coefficients, and multiple regression equations designed to predict achievement imagery and achievement motivation.

THE FINDINGS: An analysis of the descriptive data indicated that vocational-technical students (1) had a higher average age, (2) had a wider range in age, (3) had attended college a greater number of semesters, (4) had been out of high school longer, (5) were less able academically, (6) had better study attitudes, (7) had less effective study habits, and (8) appeared to be more highly motivated to do a task well. Only insignificant differences were found in the levels of achievement motivation for the two groups.

The analysis of the intercorrelation coefficients revealed positive relationships between the SSHA variables and a majority of the remaining 19 variables. Higher correlations were found between the SSHA variables and the SPQ variables than between the SSHA variables and the MCTAT variables. Little relationship was found between the SPQ variables and the MCTAT variables. Achievement imagery (AI) did not correlate significantly with any of the SPQ variables or the Study Habits (SH) variable and was correlated at the .05 level with the Study Attitudes (SA) variable. It appeared that the SSHA and SPQ variables were measuring traits different from those being measured by the MCTAT.

Full multiple regression models utilizing the MCTAT Total Score and the AI Score as criteria and all of the remaining variables with the exception of the four MCTAT pictures as predictors failed to yield F ratios which were significant at the .05 level. Regression models using the same two variables as criteria and either single variables or selected combinations of variables as predictors were also constructed. The models using the SA variable and the number of semesters out of high school as single predictors of AI were the only two models which produced significant results at the .05 level. Regression models utilizing single predictors for the MCTAT Total Score were more successful; six models produced F ratios which were significant. The model which yielded the best results was the one using the number of semesters in college as the predictor. The other five equations yielding significant results at the .05 level were the ones using SH, SA, sex, age, and the number of semesters out of high school as predictors.

The results obtained from the analysis by multiple regression equations designed for the prediction of achievement imagery and achievement motivation were not considered to be successful. It appeared that achievement motivation as measured by the MCTAT was not being measured by the SPQ.

Order No. 72-4147, 153 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Johnson (Last name), Ray (First name), Alan (Middle name)

Exact Title THE PREDICTABILITY OF THEORETICAL KNOWLEDGE OF A PSYCHOMOTOR SKILL TO THE ACTUAL PERFORMANCE OF THAT SKILL .

Degree granted Ed.D., Date 1971 No. of pages in report 127

Granted by University of Massachusetts (Name of institution), Amherst, Massachusetts (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to examine the predictability of theoretical knowledge of a psycho-motor skill to the actual performance of that skill. The study was limited to thirty-one students enrolled in a ninth grade machine shop course in a regional vocational technical school.

The first task was to train the instructors in the derivation of behavioral objectives and to have the instructors write behavioral objectives which covered the freshman students' course of instruction in the machine shop. Next, criterion reference test instruments were derived from the behavioral objectives and face validity was established for the test instruments. One instrument was designed to measure the theoretical knowledge of the students and was a paper and pencil test. The other instrument was a performance test which was a turned piece of steel that was to be produced on the engine lathe from a blueprint.

The two tests were administered to the thirty-one students and the results were recorded as dichotomous variables. The written (theoretical) instrument contained 139 questions and the performance instrument contained 28 operations to be performed. The test questions and performance operations were treated as dichotomous variables which gave a total of 167 variables to be correlated.

The tetrachoric "r" was applied to test the hypothesis and histograms were drawn to visually portray the meaningful sets of correlations between the theoretical and the performance variables. An analysis of the data enabled conclusions to be drawn that supported the hypothesis that "theoretical tests of a psycho-motor skill are not a good indicator of the ability to perform that skill."

Order No. 72-4039, 127 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Johnson (Last name), Raymond (First name), Carl (Middle name)

Exact Title A PROPOSED INDUSTRIAL ARTS PROGRAM FOR LANGSTON UNIVERSITY

Degree granted Ed.D., Date 1971 No. of pages in report 265

Granted by North Texas State University (Name of institution) Denton, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem of this study was the development of a proposal for an industrial arts program for Langston University. Particular emphasis was placed upon curriculum changes, faculty improvement, and modification of physical facilities.

The purpose of the study was to provide a high quality plan for enhancing the industrial arts program at Langston University. More specifically, the study sought the answers to five major questions: (1) What are the present course offerings in the industrial arts department at Langston University? (2) What type of work do the industrial arts students enter upon leaving Langston University? (3) Are the course offerings meeting the needs of the students when they terminate their formal educational program at Langston University? (4) How does the industrial arts program at Langston University compare with industrial arts programs in comparable universities? and (5) Are there weaknesses in the industrial arts program at Langston University, and, if so, what additions or alterations need to be made to enhance the program?

The data were obtained by questionnaires sent to (1) graduates and non-graduates of the industrial arts department at Langston University during the past ten years, 1960-1970, (2) personal interviews with chairmen of ten industrial arts departments, and (3) letters and questionnaires received from representatives of industry.

The content of the study was arranged into five chapters. The first chapter consists of an introduction, statement of the problem, purpose of the study, basic assumptions, definition of terms, limitation and background, and significance of the study.

The second chapter is a review of professional literature with emphasis placed on definitions of industrial arts, objectives of industrial arts, significant developments in industrial arts, and physical facilities in industrial arts. The third chapter is concerned with methods and procedures, sources of data, procedures for collecting data, and procedure for treating data. The fourth chapter contains data presented in tabular form. Chapter five includes a summary of the study and presents the findings, conclusions, and recommendations.

The study involved 132 adults. Questionnaires were sent to graduates and non-graduates of the department of industrial arts at Langston University, regarding strengths and weaknesses of the program, and necessary recommendations for revisions.

Permission was granted from ten chairmen of industrial arts departments to visit and survey their departments in an attempt to collect data for the study. Emphasis was placed on student clientele, location, departments having excellent industrial arts programs, plants, textbooks, staff, facilities, and equipment.

Questionnaires were also sent to various represenfatives of industry asking them to identify areas in industrial arts that are vital to their firms, and to state the approximate number of new employees with a baccalaureate degree in industrial arts their firms would hire during the next three years.

The results of personal interviews, responses from representatives of industry, graduates, and non-graduates concerning the industrial arts program at Langston University were tabulated, and the results were expressed in numbers and percentages, mean, and standard deviation.

As a result of the study it was concluded that the industrial arts program at Langston University is in need of revision and upgrading, especially with regard to course offerings and equipment.

Based upon the findings and conclusions, it was recommended that additional course offerings be added to the present curriculum, and that follow-up studies be made every ten years on graduates and non-graduates of the department of industrial arts at Langston University.

Order No. 72-4086, 265 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jones (Last name), Guy Raymond (First name), _____ (Middle name)

Exact Title AN ANALYSIS OF TEACHER-STUDENT PERCEPTION OF RATIONALE FOR ENROLLMENT OR NON-ENROLLMENT IN SELECTED ELECTIVE COURSES

Degree granted Ph.D., Date 1971 No. of pages in report 131

Granted by Florida State University (Name of institution) Tallahassee, Florida (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study consisted of a comparison of reasons given by male high school students for enrollment or non-enrollment in industrial education courses and teachers' prediction of students' reasons. A questionnaire was employed to gather selected information to investigate the efficacy of high school teachers' perception of reasons given by students for selection or non-selection of industrial education courses and to investigate the effect other selected persons had on the students' course selection. It was hypothesized there would be no difference in the reasons given for selection of courses by the students and teachers, there would be no difference in the accuracy of prediction attributable to the sex of the teacher and there would be no difference in the effect various persons had on the students' course selection.

The sample consisted of 190 teachers and 253 students from the public school system in Champaign, Illinois. Two hundred students met the criteria identified in the study as industrial education students and 153 were classified as non-industrial education students.

Data were analyzed using a t test of difference between means. The results of this study indicate: there is a significant difference between the reasons given by students for selected course enrollment and the reasons identified by teachers, there is no significant difference between the male and female teachers' accuracy of forecast attributable to the sex of the teacher, and there is a significant difference in the effect selected key people had on the students' course selection.

Evaluation of the student questionnaire item response shows that students gave as reasons for their enrollment in industrial education courses: (1) I like to work with my hands and build things; (2) The shops looked interesting to me; (3) I wanted to be able to move around during class; (4) I liked the shop courses I had taken in the 7th, 8th, or 9th grades; (5) I wanted to be able to make more money when I got out of school; (6) I wanted to be able to get a better job when I got out of school; and (7) I wanted to be able to get a part-time job while I continued in school.

Students felt they, themselves, were the person most responsible for their enrollment in industrial education courses. Help in course selection also came from parents, vocational teachers, and friends.

The results indicate that the staff could benefit from an in-depth explanation of the industrial education program and the reasons male students give for their enrollment or non-enrollment in these courses.

It is recommended that continued emphasis be placed on the "doing" aspect of industrial education courses as well as the high school and post high school remenerative aspect of the industrial education courses.

Further research to identify the cause and effect of early high school graduation, the reasons given by students for dropping out of high school, and methods for developing a more effective presentation of course information to students as well as a replication with female subjects would benefit the secondary education program. Order No. 72-13,523, 131 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Jones (Last name), Janie (First name), L. (Middle name)

Exact Title PERSONALITY IN VOCATIONAL OCCUPATIONS

Degree granted _____, Date 1969 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To measure selected personality characteristics of successful students in each of four occupational areas: a) data processing, b) secretarial administration, c) nursing, and d) engineering and To identify those specific personality characteristics which significantly discriminate between students in the four ares.

Source of data and method of study:

Students tested were enrolled in the second year of a two-year vocational training program in selected junior colleges. A total of 218 students were included in the study, and all students completed Form B of Cattell's Sixteen Personality Factor Questionnaire.

Techniques of analysis utilized were the discriminant function and analysis of variance. The discriminant function was used to validate the existence of sufficient differences in personality characteristics of the four groups to provide a basis for discrimination among them. This was followed by an analysis of variance on each of the 16 variables to identify the specific variables on which significant differedncs were present. Comparisons were made on two groups at a time, and each group was compared with all other groups.

Findings and Conclusions:

1. The engineer is more reserved, detached, and critical, and more aggressive and independent than any of the other three groups.
2. The secretary is much more conforming and accommodating, more out-going, and more conservative than the other three groups.
3. The nurse is significantly more shrewd, calculating, and worldly than the other three groups.
4. There is no one personality trait which would distinguish the data processor from all other groups tested.
5. There are a number of other personality traits which are significant in terms of one group being compared with one other group.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Juang, Hwai-I, _____
(Last name) (First name) (Middle name)

Exact Title RATES OF RETURN TO INVESTMENT IN EDUCATION IN TAIWAN AND THEIR POLICY IMPLICATIONS: A COST-BENEFIT ANALYSIS OF THE ACADEMIC HIGH SCHOOL AND THE VOCATIONAL HIGH SCHOOL

Degree granted Ed.D., Date 1972 No. of pages in report 214

Granted by Columbia University, New York City, New York
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

A longitudinal empirical study was conducted to investigate the return to upper secondary education in Taiwan. The study represents an attempt to apply economic theories and techniques to the field of educational administration with special reference to educational planning. The purpose was to test the relationship between education and earnings in quantitative terms and to explore further the policy implications of the results. The returns to investment in four types of high school programs: academic, commercial, industrial, and agricultural were compared from both the social and the private viewpoints. A sample of 279 subjects graduated in 1957 was used for the analysis.

The theoretical assumption was that under a competitive labor market price system, if the manpower supply and demand are in equilibrium, *certeris paribus*, the same dollar investment in education will have the same amount of influence on earnings, even if the types of training are different. A main hypothesis and four supplementary subhypotheses were postulated. The main hypothesis was:

> The vocational high school programs have the same private and social rates of return as the academic high school program, excluding the value of the option of going on to higher education.

The four subhypotheses were:

1. The market is competitive.
2. The manpower supply and demand are in equilibrium.
3. If the rates of return are different, there is a negative correlation between the rates of return and the rates of unemployment. If the rates are the same, the correlation is zero.
4. If the schooling costs are different, there is a positive correlation between the costs and the lifetime earnings.

If the costs are the same, the correlation is zero. The hypotheses were tested with the empirical findings and correlation analyses.

Two statistical methods: the linear multiple regression model and the Denison Coefficient Alpha were used to determine the net effects of education on earnings. In regressions, earnings in actual dollar terms and in natural log were entered as the dependent variables. They were discounted back to 1955 at 0%, 5%, and 10%. The size of the Coefficient used was 0.6. The profitability was evaluated in terms of the present value and the internal rate of return.

The results of the analysis indicated that the commercial high school had the highest return, followed in order by the industrial, the academic, and the agricultural high school. When the option value was included, the academic high school became the most advantageous, followed in order by the commercial, the industrial, and the agricultural high school. The social return was higher than the private return, indicating that society as a whole recouped greater return from investing in high school education than individuals. Both the social and the private internal rates are greater than or comparable to the bank savings deposit interest rates. High school education is a viable investment for the public as well as the individuals, even when only the direct economic return is considered. When the hypotheses were tested, it was found that the rates of return for the four types of high schools were substantially different, disproving the main hypothesis. Further testing of the subhypotheses suggested that the manpower supply and demand were not in equilibrium, and considerable amount of restriction on labor market prices existed, probably due to the wide use of governmental salary schedules. The highest RSQ attained by the final regression equation was 0.3266. The educational variables together accounted for about 48.5% of the total RSQ.

Order No. 72-19,517, 214 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Kapes (Last name), Jerome (First name), T. (Middle name)

Exact Title THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE

Degree granted Ph.D., Date 1971 No. of pages in report 141

Granted by The Pennsylvania State Univeristy (Name of institution) University Park, Pennsylvania (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1. What characteristics of ninth graders are predictive of high school curriculum selection; 2. What characteristics of ninth graders are predictive of success in the high school curriculum selected?

Source of data and method of study.

16 student characteristics were selected as independent variables for a sample of 458 male students in a high school in Pennsylvania. The dependent variables were enrollment in either vocational or academic curriculum, and grade point average in the ninth grade. Analysis of the data was accomplished by use of the multiple regression analysis and the multiple discriminate function analysis.

Findings and Conclusions:

While 12 of the variables correlate significantly with the criterion, all of the variables taken together account for only 22 percent of the variance associated with the choice of a vocational versus an academic curriculum in tenth grade, and six of these variables possess most of the unique information available from the initial 16 variables.

The choice of a vocational versus an academic curriculum in tenth grade is uniquelyand positively related to the GATB aptitude Manual Dexterity, and uniquely and negatively related to the GATB aptitudes Numerical and Motor Coordination, the value Prestige, amount of Father's Education and level of Occupational Aspiration.

Wile all five non-manipulative GATB aptitudes are postively related to academic GPA, only aptitudes verbal and numerical are necessary to provide most of the unique information contained in all five variables.

Vocational Maturity, Father's Education and level of Occupational Aspiration are all psitively related to academic GPA, and along with the GATB aptitudes Numerical and Verbal provide most of the unique information contained in the entire set of 16 variables.

Of the 16 student characteristic varibles included in this study the GATB aptitudes Verbal and Numerical, the value Prestige, the construct of Vocational Maturity and the socioeconomic variables Father's Education and level of Occupational Aspiration appear to contain most of the discriminating information necessary to distinguish among successful and unsuccessful vocational and academic students.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Karnes (Last name), James (First name), B. (Middle name)

Exact Title EMERGING PROGRAMS OF VOCATIONAL AND TECHNICAL EDUCATION IN SECONDARY SCHOOLS IN MISSOURI IN RELATION TO MANPOWER NEEDS

Degree granted Ed.D., Date 1966 No. of pages in report 313

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain 1-how well existing and proposed vocational programs correspond with projected manpower needs of the state labor force, 2-what assistance administrators and school boards desired in establishing and expanding programs, 3-attitudes of superintendents and school board presidents toward reimbursable programs, 4-how many districts anticipated new and expanded programs and what was the nature of them, 5-the anticipated increase in numbers of new teachers and supervisors, 6-what effects these programs will have on practical arts courses, and 7-implications for teacher education, supervisions, leadership developemt and curriculum design.

Source of data and method of study:

Following an analysis of legal and administrative requirements of federal laws governing reimbursable programs, an information form was constructed and perfected. The form was sent to the 506 secondary school superintendents and 17 local directors of vocational education in Missouri. An abbreviated form was mailed to the 506 secondary school board presidents. Certain data were obtained from records at the Missouri State Department of Education. The data received pertained to existing programs, plans and curriculum modifications anticipated, attitudes towards certain requirements and relative merit attached to various courses and programs in relation to plans for establishment on which a statistical test of homogeneity was amde. Findings pertaining to present enrollment and expansion were related to projected manpower needs to 1970.

Findings and Conclusions:

1. Serious inadequacies ixist in the areas of health occupations, technical and trade and industrial courses.
2. Most expansion may be expected in areas already having the largest enrollment.
3. The greatest need for expansion exists in business and trade and industrial education.
4. The greatest change in agriculture will be the addition of unit courses in occupations related to farming.
5. More reimbursement will be necessary to establish programs than has been available in the past.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Keller (Last name), Joseph (First name), Marvin (Middle name)

Exact Title THE EVOLVING ROLE OF THE CHIEF VOCATIONAL-TECHNICAL ADMINISTRATOR IN SELECTED FLORIDA PUBLIC COMMUNITY COLLEGES

Degree granted Ed.D., Date 1971 No. of pages in report 169

Granted by University of Florida (Name of institution), Gainesville, Florida (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to ascertain the role of the chief vocational-technical administrator in selected public community colleges in Florida. The study addressed itself to three specific questions: (1) What is the present role of the chief vocational-technical administrator in institutions designated area vocational centers? (2) What are the critical tasks of this administrator in fulfilling the goals of occupational education in the institutions? (3) What is the evolving role of the chief vocational-technical administrator in these community colleges?

The four institutions selected for this study include all of the public community colleges in Florida designated area vocational centers, having a full-time equivalency student enrollment exceeding 400 in occupational education for the fall semester of 1970.

Interviews were conducted with the chief vocational-technical administrator, his immediate superior, two or more division chairmen, and one member of an occupational advisory committee at each institution.

There were three sub-areas of major importance cited within the total task area of general administration and supervision. These three sub-areas were: (1) maintaining an interface between the vocational-technical section of the institution and the balance of the college; (2) long-range planning; and (3) maintaining an interface between the vocational-technical interests of the community college and agencies or groups outside the institution.

The chief vocational-technical administrators did not agree on their most critical tasks in the area of general administration. Coordination of reports, policy development, and intra-institutional liaison were each given as the most critical. Their immediate superiors were unanimous, however, in citing effective long-range planning as the number one task.

These perceptions varied sharply with the division chairmen who were nearly unanimous in stating that providing leadership in new program planning, expediting division recommendations, division requests, and interpretation of laws and legislation were the most important tasks in their respective order.

There was a great disparity among the categories of respondents in the perception of the chief vocational-technical administrator's present role in curriculum administration and development. The chief administrators indicated their present role was essentially one of encouragement of curriculum re-examination and change. Their immediate superiors, however, agreed that curriculum development was primarily the responsibility of the division chairmen. The division chairmen, though, were in agreement on at least six responsibilities of the chief vocational-technical administrator in the area of curriculum development. These six responsibilities were: (1) to initiate and coordinate research on new program needs in the local industries and community at large; (2) to articulate vocational-technical programs with technical societies, state licensing agencies, and industry; (3) to evaluate program effectiveness; (4) to maintain curriculum liaison with other parts of the college; (5) to articulate college programs with high school programs; and (6) to determine new program placement among divisions.

In the curriculum administration and development task area, the chief administrator viewed the top tasks as the development of new programs and the supervision and evaluation of existing programs. None of their immediate superiors rated any aspect of curriculum development as a critical task.

The division chairmen generally viewed tasks within curriculum administration and development as more critical than the chief administrator's role in general administration and supervision.

The division chairmen specifically identified three primary tasks of the chief vocational-technical administrator in curriculum administration. These three tasks were: (1) providing resources for instructional improvement; (2) conducting and/or coordinating surveys to determine need and content for new programs; and (3) reviewing new and existing courses for content balance.

The study revealed that the other five task areas were perceived as being secondary or not a part of the chief vocational-technical administrator's role.

Order No. 72-16,618, 169 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Khoshzamir, Firouz, ____
(Last name) (First name) (Middle name)

Exact Title DEVELOPMENT AND ADMINISTRATION OF VOCATIONAL AND TECHNICAL EDUCATION IN IRAN: PROGRAM IMPLICATIONS FOR HUMAN RESOURCE DEVELOPMENT

Degree granted Ph.D, Date 1971 No. of pages in report 270

Granted by The University of Wisconsin, Madison, Wisconsin
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

There has been an increasing awareness of the shortage of skilled, semi-skilled and professional workers in Iran. Increasing numbers of such workers are needed in the country in order to speed its development. Human resource development is a necessary condition for achieving economic stability. A developing country like Iran needs not only educated political leaders, lawyers, doctors and engineers, but also technicians, farmers, and craftsmen as well, to spur its development. It is imperative that in a developing country, a large proportion of the population be given practical skills, and it is the responsibility of the people in government and education to make opportunities possible to meet this need. Effective programs of vocational and technical education are a sound means of providing required skills.

This study examines the present administration of vocational and technical education in Iran with the hope of formulating an effective approach to meeting the demands for human resource development. An appraisal of vocational and technical education has been made of programs both in Iran and Turkey and certain comparisons have been made. The writer employs the historical method, documentation of both primary and secondary sources, and other related information. Information is secured from officials and agencies in Iran, Turkey, and the United States.

This study provides a general basis for a plan for efficient administration and supervision of vocational and technical schools geared to the demands of the human resource development plan of Iran. The study also suggests a model for the organization and administrative structure specifically designed for vocational and technical education. Such a contribution is significant to the many Iranians who are presently engaged in the promotion of the economic growth of the country which can be made possible only through the people's response to manpower needs.

Order No. 71-9178, 270 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author KIEFT (Last name), LEWIS (First name), DEAN (Middle name)

Exact Title An Experimental Study of the Effect on Cognitive Learning When a Psychomotor Task is Anticipated

Degree granted Ph D, Date 1970 No. of pages in report 177

Granted by Ohio State University (Name of institution) Columbus, Ohio (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )
Ohio State University or University of Michigan

Purpose of Study·

To provide evidence that would indicate that a student's cognitive learning can be increased if that student is first motivated through a psychomotor activity and competition.

Source of data and method of study·

This was an experimental study conducted with eight classes of Jr. high school industrial arts students from Dominion Jr. High in Columbus, Ohio. Certain groups acted as "control groups" and received a presentation (taped) concerning certain characteristics of metal and then were tested. Other groups were prepared for laboratory psychomotor activities and then were given the presentation and test. The remaining groups were involved with competition and the activities.

Findings and Conclusions :

At the 7th and 8th grade level, an increase in cognitive learning was shown by those who were motivated by the activities and competition, but this increase was not significant.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Killam (Last name), Jacqueline (First name), Rae (Middle name)

Exact Title OCCUPATIONAL INFORMATION RELEVANT TO THE PLASTICS INDUSTRY RECOMMENDED FOR SECONDARY CURRICULA

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

This research was confined to the comparison of the needs of the plastics processing industry with occupational skills and knowledges suitable for secondary school instruction.

Source of data and method of study·

The literature was reviewed. A list of skills and related occupational information about the plastics processing industry was developed.

Evaluating the responses of the educators by categories it was found that Knowledges, Finishing, and Fabricating were the most suitable categories for instruction in junior high schools, while Knowledges, Career Opportunities and Finishing were similarily appropriate at the senior high school level. Educators placed great emphasis on awareness of hasards and knowledge of types of plastics as most appropriate for junior high school students, while they ranked knowledge of manufacturing career opportunities as most appropriate for senior high school students.

Industrial respondents consider Finishing, Fabricating, and Basic Processes to be most important for semiskilled workers. Inspection, Knowledges, and Job Description categories were their choice as the most important for skilled workers to know.

Findings and Conclusions:

1. Educators are less knowledgeable about the plastics processing industry's needs than the industry members would kile them to be.
2. Educators and industry have much work to do together.
   A. This will consist of setting up programs for students to learn meaningful facets of the plastics processing industry so that they may be qualified to fill the occupations currently available.
   B. Fill new needs as the industry expands, according to educated predictions.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Kingsley (Last name), Leonard (First name), D. (Middle name)

Exact Title THE DEVELOPMENT OF AN AREA VOCATIONAL SCHOOL: HISTORY, ISSUES, AND PLANNING IMPLICATIONS.

Degree granted Ed.D., Date 1972 No. of pages in report 164

Granted by The University of Toledo (Name of institution), Toledo, Ohio (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The establishment of Penta County Joint Vocational High School represented a pioneering effort in providing vocational education. Penta County JVS was unique in that it was (1) the first school established as a result of an agreement among city and rural school districts to pool their resources to provide vocational education; (2) the first school to serve students on an area wide basis with comprehensive offerings in all of the vocational service programs; (3) the first joint vocational school to provide a comprehensive offering of all subjects, thus permitting students to be in attendance on a full day basis; (4) the first to offer vocational education programs to a wide range of student ability levels; and (5) the first school to provide some of the newer vocational programs such as horticulture, industrial agriculture mechanics, and child care.

The purpose of the study was to record those events associated with the establishment of Penta County JVS. The information was presented in such a way that parts of it may be used independently by those who may have a need for this information in connection with the formation of future schools.

Vocational education has evolved through several centuries. From the time when man first identified "callings" or "vocations" through the twentieth century when legislation was formulated to support and encourage vocational training there has been recognition of the need for the development of salable skills. The greatest impetus was given to the joint vocational school movement when the Vocational Education Act of 1963 was passed by Congress. Funds provided by this Act stimulated activity to improve and upgrade vocational education programs. These national developments were a prelude to the establishment of this school.

Information for this study was secured from persons closely associated with the formation of the school as well as from the existing files and archives. The data has been presented in chronological order with a review of the decision-making activities engaged in prior to the opening of the school.

A review of the many events associated with the establishment of Penta County JVS revealed that the most important issues confronting the joint vocational school leadership were: (1) problems associated with securing cooperation of school districts; (2) funding considerations; (3) status or recognition of vocational education; (4) determination of vocational programs to be offered; (5) staffing of the joint vocational school; and (6) the operational relationships with member school districts.

Recommendations to those planning similar schools growing out of the study were: (1) endeavor to develop a grass roots recognition of the need for comprehensive vocational education programs; (2) develop a clear understanding of the uniqueness of the JVS in terms of the costs associated with the operation; (3) select vocational programs which have been successful in other Ohio communities with similar employment opportunities; (4) provide ample opportunities for all levels of the school leadership to meet and consider means of resolving operational problems. Recommendations directed to the Penta situation were: (1) plan to make information relating to the establishment of Penta County JVS a part of the school district archives; and (2) prepare a record of the operation of Penta County JVS covering the period from 1965 through 1971.

Since as of 1971 there are still thirty-seven joint vocational schools to be established in Ohio alone, this analysis and chronicle of events should be of help to those facing this task.

Order No. 72-20,181, 164 pages.

SOURCE COPY FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Kistler (Last name), Dale (First name), Elton (Middle name)

Exact Title EDUCATIONAL TRAINING AND JOB ENTRY PERCEPTIONS AND RECOMMENTDATIONS FOR ADMINISTRATIVE LEADERSHIP AS PERCEIVED BY SEMISKILLED AND SKILLED WORKERS AND FOREMEN

Degree granted Ph.D., Date 1971 No. of pages in report 213

Granted by Miami University (Name of institution), Oxford, Ohio (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

In this study information was sought from semiskilled and skilled workers and their foremen. It was reasoned that the educational background and work experience of these men would qualify them to make judgments in two major areas:

(1) Was the educational and industrial training background of the worker suitable for the job the worker is currently performing?
(2) From the workers' standpoint, what preparation was necessary for today's young people seeking entry into the same occupation in which the worker is employed?

The work force of twenty-five selected businesses in seven selected occupational areas were surveyed using a substantially modified form of Purdy's Advisory Council for Vocational Education questionnaire. A total of 940 workers were surveyed with responses from 428, or a 45.6% return.

Conclusions

(1) The workers viewed completion of high school as an almost absolute necessity. Further, a great majority felt that training beyond high school was necessary. An overwhelming majority of the workers viewed their high school education in a positive light even though over half of the respondents said the high school was not doing a good job preparing young people for the world of work.
(2) An expansion of the vocational program and course variety, attitudes and values, vocational counseling and program flexibility were areas of the school program the workers felt were in most need of improvement.
(3) Just over half of the workers reported that they would have enrolled in a vocational school if one had been available. Nearly three workers in five supported the idea of requiring a vocational decision of non-college bound high school students.
(4) The average worker reported having a non-vocationally related job while in high school that he did not continue with after graduation. He reported that his training prior to assuming his job was satisfactory and that training was on-the-job training by a three to one ratio over the next most frequently reported kind of training.

Recommendations

(1) It is recommended that a new alliance be forged between public school educators, higher educators and those in the private sector whose primary job is to secure and train a qualified work force. Such an alliance should be concerned with a coordinated and efficient (yet flexible) plan for training young people for entry into the work force.
(2) It is recommended that school administrators restructure their program of studies in a serious effort to relate directly to the needs of young men and women who will be entering the work force.
(3) It is recommended that at least one vocationally trained guidance counselor be employed in every high school across the state.
(4) It is recommended that school administrators exercise every effort to ensure that solid attitudes and values are taught relative to the value of a job, the importance of accepting responsibility and the importance of excellence in workmanship.
(5) It is recommended that school administrators eliminate tracking systems and allow maximum flexibility in student course selection.
(6) It is recommended that school administrators generally and vocational school administrators specifically embark upon a public relations campaign in an effort to change the image of vocational schools.
(7) It is recommended that high school aged young people be encouraged to make a vocational decision as early as practicable for each individual young person.
(8) It is recommended that as many cooperative programs as possible be established and carefully cultivated.

Order No. 72-20,287, 213 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ko (Last name) Jiin-rong (First name) , (Middle name)

Exact Title AN INVESTIGATION OF THE USE OF HOLLAND'S CAREER CHOICE TYPOLOGY FOR EDUCATIONAL GROUPING

Degree granted Ed.D., Date 1972 No. of pages in report 169

Granted by Rutgers, the State University of New Jersey (Name of institution) New Brunswick, New Jersey (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain: (1) Whether Holland's typology theory of career choice was applicable to grouping community college students; (2) Whether educational grouping based on the criteria of interests and personalities could achieve congroent interactions between the individual student and his peer environments; (3) The possibility of utilizing the comparative interest indes (CII) of the Comparative Guidance and Placement (CGP) program for grouping two-year college students.

Source of Data and Method of Study:

Data were collected to determine: (1) the similarities and differences of personality types as measured by Holland's Vocational Preference Inventory (VPI) Vocational interests as measured by the CII within and among four academic clusters: Business and Management, Natural and Applied Sciences, Human Affairs, and Applied Humanities.

The subjects were 64 male and 64 female students who had completed 20 or more credits of course work at Brookdale Community College, New Jersey. Multivariate analysis of variance was applied to both the VPI and CII data.

Findings and Conclusions:

Null hypotheses 1,2, and 3 under test in their respective order postulated that there would be (1) no differences in personality types among the four academic clusters, (2) no differences in personality types between the two sexes, and (3) that the interaction of the cluster and sec relation to personality types would not be significant. Null hypotheses 1 and 2 were both rejected at the .001 level while null hypothesis 3 was accepted.

Null hypotheses 4,5, and 6 under test in their respective order stated that there would be (1) no differences in vocational interests among the four academic clusters, (2) no differences in vocational interests between the two sexes, and (3) that the interaction of cluster and sex in relation to vocational interests would not be significant. Null hypotheses 1 and 2 were both rejected at the .001 level, while null hypothesis 3 was accepted.

Null hypothesis 7 under test stated that there would be no intercorrelations between the VPI and the CCI, Null hypothesis 7 was rejected at the .01 level.

Null hypotheses 8 and 9 under test stated that the VPI and CII would, respectively, have no significant discriminating powers to classify the subjects into the four academic clusters. Niether null hypothesis could be supported. Under test null hypothesiss 10 was accepted.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Koch, Jr. (Last name) Carl (First name) , (Middle name)

Exact Title A HISTORICAL REVIEW OF COMPULSORY SCHOOL ATTENDANCE LAWS AND CHILD LABOR LAWS

Degree granted Ed.D., Date 1972 No. of pages in report 225

Granted by University of Wyoming (Name of institution) Larmie, Wyoming (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To examine the historical background of compulsory school attendance laws and child labor laws. To determine the authority of the state to enact compulsory school attendance laws and child labor laws; as well as the authority of states to compell parents, guardians or whoever had custody of children to place their children in school along with regulating the work of children. To determine what relationship existed between the compulsory school attendance laws and child labor laws to the school leaver. To examine some of the more obvious complexities related to the compulsory school attendance laws and the child labor laws. To determine the legal principles established by the courts within each of the areas investigated, the legal basis upon which the courts within each of the areas investigated, the legal basis upon which the courts made their decisions, and the relationship of these laws to school dropouts. To study the laws as they pertained basically to public school attendance.

Findings and Conclusions:

The legality of compulsory school attendance laws was based on the First and Fourteenth Amendments of the United States Constitution. The legality of child labor laws was based on the Tenth and Fourteeth Amendments and Article I, Section 8 ofthe United States Constitution. Since the states were delegated the authority to enact compulsory school attendance laws and child labor laws the states could require the parents to see to it that their children were educated according to the laws. Compulsory school attendance laws did not show an interrelation to child labor laws. Child labor laws showed a relation to school attendance since three-fourths of the states definitely mentioned school in their laws. The age requirement and the length of time for a person attending school varied from state to state. The right to regulate the work of children was a perrogative of the state not the Federal government. The Federal Government had the power to regulate commerce and the Fair Labor Statndards Act was declared constitutional through the commerce clause. Indirectly the Federal Government did regulate child labor. Some of the child labor laws were updated to suit local situations. The child labor laws did not permit school children to work shile school was in session. Since the parents were responsible for granting permission for children to work. the child labor laws applied only to work done out in society, not at home. Guidance and counseling at the elementary school level aided in alleviating possible causes for a child to begin to think about leaving school. Since a number of states had antiquated compulsory school attendance laws, a renewed interest in the compulsory school attendance laws by some states brought about modification of those laws.

On the basis of this study, it was recommended that federally funded programs and new school techniques be utilized to educate today's children.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author KOEHLER (Last Name), MYRON (First Name), _____ (Middle Name)

Exact Title THE RELATIVE COST EFFECTIVENESS OF "30 AND 6" DRIVER EDUCATION AND SIMULATOR TRAINING IN SELECT TEXAS PUBLIC SCHOOLS

Degree Granted Doctor of Education, Date December 1972 No. of pages in report 197

Granted by Texas A&M University (Name of Institution) College Station, Texas (City, State)

Where Available: Microfilm (XX) MIcrofish ( ) E.R.I.C. (XX)

Purpose of Study: 1. Determine if students who were taught "30 and 6" or simulation had better driving records than students without driver educaton. 2. Ascertain relative cost per student for providing these programs in various size schools under different instructional conditions. 3. Establish which type of program produced students with the better driving records for the amount of revenue expended.

Source of data and method of study: Student data and driver education cost data were provided by 32 schools in 17 districts. Individual driver and accident records were provided the Department of Public Safety. Student's "t" test was used for matched pairs. The ratio of two Poisson means was used for independent treatment groups. Wilcoxon's nonparametric test for paired data was used to analyze subsets. Criteria used to evaluate were convictions and accidents, severity of accidents, and time lapse from initial issuance to first involvements.

Findings and Conclusions: 1. Using conviction criterion, students of "30 and 6" programs had no better driving records than students without driver education. But using accident criterion, students of "30 and 6" had significantly greater accident involvement than their matched members. Two subsets, one controlled chronological age within six months and the other controlled driving experience within three months, were analyzed. The results of the first supported the null hypothesis while the second one contradicted it. 2. Using conviction criterion, students of simulation were significantly better drivers than those without driver education. But using accident criterion, students of simulation had no better driving records than their matched member. 3. Using conviction, accident, and severity of accident criteria, simulator training produced significantly better drivers than "30 and 6" driver education. 4. Students of simulation had significantly less severe accidents than those of "30 and 6". Students taught simulation by teaching assistants had more severe accidents than those taught by certified teachers. Students taught "30 and 6" in urban areas had more severe accidents than those taught in suburban areas. 5. Cost per student for simulator training was significantly less expensive than "30 and 6" and driver performance of the students taught simulation was significantly better than for "30 and 6" subjects. Cost per student for simulation taught by teaching assistants was less expensive than simulation taught by certified teachers. Cost per student for "30 and 6" programs was more economical in urban area than in suburban areas.

1. The "30 and 6" program should be upgraded to an efficient level or replaced by simulation. 2. Greater instructional emphasis should be placed on accident avoidance and damage reduction if an accident is imminent. 3. Experimental studies should be initiated to upgrade teaching techniques for control of emergencies, accident avoidance, and minimized damage due to accidents. 4. Statewide systems of cost accounting and teacher supervision for driver educaiton should be developed by the Texas Education Agency. Education Service Centers should be used for administrative pruposes. 5. Legislation should be enacted to establish driver education as a semester course with credit. The curriculum content and teacher certification should be upgraded as well as financing driver education through the School Foundation Program. 6. Additional research should be conducted to investigate parameters which may influence results of driver education, such as: socioeconomic family status, ethnic structure and stability of the community, strictness of traffic law enforcement, court dispositions of traffic citations, and various conditions of the teaching environment.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Krause (Last name), Roy (First name), Willard (Middle name)

Exact Title A HISTORY OF THE MICHIGAN INDUSTRIAL EDUCATION SOCIETY

Degree granted Ed.D., Date 1970 No. of pages in report 416

Granted by Wayne State University, (Name of institution) Detroit, Michigan (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Statement of the Area

The purpose of the study was to focus primarily on the historical development of the Michigan Industrial Education Society (MIES) and its influences in and contributions to industrial education in Michigan. More specifically the study was an effort to bring together facts which were significant in reconstructing a historical account of this organization from 1920 to 1970 and to record the services of various leaders and pioneering committees within the organization.

Sources of Data

The first step in the production of a historical work is the gathering of data pertinent to the topic. Historical data were collected utilizing resource centers such as the Burton Historical Library, the Detroit Public Library, and the Wayne State University Library.

In a preliminary search for historical data, the aforementioned resource centers were utilized in locating bibliographies; card catalogs; periodical indexes; historical reviews; essays, theses, and doctoral dissertations; research journals; and publications of the Michigan Industrial Education Society. These data provided the basis to begin with secondary sources and to work back to the primary sources.

Particularly significant to the location of primary sources for the study was the cooperation of the Michigan Industrial Education Society in making available all data stored within the archives of their historical files.

Methodology Employed

After a careful review of the professional literature in the field of educational research, the historical research methodology was selected over other research techniques. The historical method is different from other forms of scientific research methodology in that the historical research method deals specifically with data that are already in existence.

Three major processes were used in the plan to produce the written historical work. These essential processes were: 1) the collection of data; 2) the criticism of data; and 3) the presentation of the facts.

Major Findings of the Study

The influence and contributions of the MIES in industrial education in the State of Michigan are directly traceable throughout the years. Data support that the MIES has continued a position of leadership on the state level since the conception of the movement in 1920. Through the efforts of pioneering committees and individuals, the purposes of industrial education in the State of Michigan have been promulgated on the local, state, and national levels. Since the formative years, leaders have proclaimed the MIES as one of the outstanding state organizations in the United States.

More specifically, the influences and contributions of the MIES are reflected conspicuously in such areas as: the promotion of industrial education in the State of Michigan, as well as on the national level; the development and dissemination of instructional materials; the encouragement and support of scholarly research; active involvement in the activities leading up to the support and passage of legislation on the state and national levels; and a commitment to provide meaningful experiences in the educational development of Michigan youth.

Order No. 71-434, 416 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ku (Last name), George (First name), C. (Middle name)

Exact Title AN ANALYTICAL STUDY OF THE 1971-72 COOPERATIVE VOCATIONAL PROGRAM IN UTAH WITH COMPARICON TO A GUIDELINE FOR COOPERATIVE VOCATIONAL PROGRAMS.

Degree granted Ed.D., Date 1973 No. of pages in report 121

Granted by Utah State University (Name of institution), Logan, Utah (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1) To develop a guideline for cooperative education; 2) To determine the current status of cooperative vocational education in Utah; and 3) to compare current practices with the established guideline.

Source of data and method of study

This study was completed in two parts. The first part involved the construction and verification of a guideline for cooperative education in Utah; the second, a survey of the current status of cooperative education. A descriptive survey technique was employed to gather data required for determination of the guideline's validity and relevance, and the current status of cooperative education in Utah.

All 13 key administrators in the state office, 75 coordinators representing 84 percent of the initial mailings and 112 cooperating employers or 74 percent of the selected sample participated in this study.

Findings and Conclusions:

Opinions from the 13 key administrators in the Utah State Division of Vocational and Technical education were largely in agreement with the tentative guideline derived from the two nationally accepted guides in cooperative education.

Due to the lack of an official guide for cooperative education in Utah, many of the coordinators' interpretations of federal legislation and state regulations were based on their own conveniences. Inconsistencies in programs standards and requirements were frequently found among cooperative programs in Utah.

There appear to be some discrepancies existing between the current practices and the established guideline mainly because in a majority of the programs: (1) Students spend indufficient numbers of hours in attending school or receiving on-the-job training; (2) Schools provide inadequate in-school instruction; and (3) Students receive substandard on-the-job supervision.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author KUETEMEYER (Last Name), VINCENT (First Name), FREDERICK (Middle Name)

Exact Title A PROFILE DEVELOPMENT OF THE TRAITS, ATTITUDES AND EXPERIENCES OF INDUSTRIAL ARTS STUDENT ASSOCIATION ADVISORS WITH IMPLICATIONS TOWARD INDUSTRIAL ARTS TEACHER EDUCATION

Degree granted Doctorate of Education Date Dec., 1972 No. of pages in report 123

Granted by Texas A&M University (Name of institution) College Station, Texas 77843 (City, State)

Where Available: Microfilm ⊗ Microfish ( ) E.R.I.C. ( )

Purpose of Study: The purpose of the study was to initiate, develop and test specific traits, attitudes and experiences of active and inactive industrial arts student organization advisors. An indirect objective of this research was to improve both the number and expertise of professional student activity advisors.

Source of data and method of study: A research instrument, PLATE, composed of the adult level of the California Test of Personality together with an experience related questionnaire was mailed to two hundred participants representing active and inactive groups. An 89% return represented industrial arts teachers from twenty-seven states. Analysis of variance and chi-square testing was used to evaluate the data.

Findings and Conclusions: Statistically, industrial arts teachers classified as student activity advisors differ from those industrial arts teachers classified as non-advisors on two of the tested concepts: number of professional organization memberships and amount of previous organized volunteer work. Support for those things which one believes to be worthwhile was evident in the responses of the participants. Based upon the data, there is no indication that either the personal or social adjustment of an industrial arts teacher has any influence upon his involvement as an advisor to a professional student organization.

Unexpectedly, monetary compensation for extra-curricular activities did not appear as a significant factor between active and inactive classifications. Analysis of the data indicated a high level of professional involvement by the active classification group. This conclusion introduces a thought concerning professional involvement and student organization involvement- -which activity encourages the other?

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lacroix, William, James
(Last name) (First name) (Middle name)

Exact Title STUDENT ACHIEVEMENT IN A GENERAL EDUCATION COURSE USING SELECTED EXPERIMENTAL TIME ALLOCATIONS

Degree granted Ph.D., Date 1971 No. of pages in report 185

Granted by Iowa State University Iowa City, Iowa
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

This experimental study was designed to examine student achievement in a General Education course (Modern Technology and Civilization) at St. Cloud (Minnesota) State College. Subjects included 215 males and 255 female students of varied curricula.

Controlled experimental variables were: (1) time of day for course exposure, (2) pretest participation, and (3) number of hours each week a student was formally exposed to course content. In addition to the controlled variables, instructor effect and seven student characteristics (factors) were examined in relation to student achievement.

For this study, student achievement was defined to be that standard normal composite score of mid-quarter and final examinations. Those student factors studied were: (1) age, (2) quarters of college experience, (3) marital status, (4) college residence, (5) automobile availability, (6) college transfer status, and (7) sex.

The experimental design was a modified version of the Solomon four-group design. Data analyses included analysis of variance, analysis of covariance, regression analysis, t-test statistics, and the regression procedure of backward elimination model-building. Covariates employed in the analyses of covariance were the American College Testing Program (ACT) composite score and high school percentile graduation class rank (HS%R).

It was found that the time of day in which course content was experienced had no effect on student achievement. Nor did participation in the pretest sensitize a student toward greater achievement. However, students experiencing instruction four hours each week achieved significantly higher criterion scores than did those students in the three hours per week and one hour per week groups. There was no difference in achievement between the two latter groups.

Although the data analysis in this experiment indicated non-significant instructor differences, all student factors studied did exhibit statistically significant differences.

Older students and students of greater college experience tended to achieve higher criterion scores. Married students and transfer students scored higher than their respective non-married and non-transfer classmates.

Students residing in a parent's home, or in a dormitory, did not achieve to the extent realized by rooming house and apartment renting students. Those students who had access to automobiles during the experiment tended to achieve more on the criterion measure than non-driving students. In the industry-oriented General Education course of this experiment, male students had a significantly higher criterion mean score than did female students.

Order No. 72-5220, 185 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Land (Last name), Ming (First name), Huey (Middle name)

Exact Title THE STATUS OF ADVISORY COMMITTEES FOR VOCATIONAL AND TECHNICAL EDUCATION IN UTAH WITH COMPARISON OF THE STRUCTURE AND FUNCTIONS TO A THEORETICAL MODEL

Degree granted Ed.D., Date 1971 No. of pages in report 116

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

It was the purpose of this study to determine the current status, structure, and functions of advisory committees for vocational and technical education in Utah and to compare the structure and functions with a theoretical model of advisory committees derived from the literature on the subject.

There was a total of 105 advisory committees, including 33 general committees and 72 craft committees, in 24 school districts, 10 high schools, and 6 public technical colleges.

A majority of some 75 percent of the advisory committees were rated as good to excellent on a five-point scale in achieving their objectives. A great majority of committee members, approximately 85 percent, rated the support for membership they received as good to excellent.

The membership of craft committees ranged from 2 to 14 members with a median of 6. General committees had a range from 2 to 31 with a median of 8.

Slightly over 70 percent of the committees met three times or less during the 1968-1969 school year.

Of the 12 functions of the theoretical model, those ranking highest in practice and relative importance were functions related to improving public relations, curriculum development, evaluation of programs, and support for school legislation. Ranking lowest were functions related to teacher and student recruitment.

Comparison of the practice of functions with the theoretical model showed that the degree of agreement was only 33 percent between the practice and the model. The degree of agreement between the relative importance of functions and the theoretical model was 83 percent. The practice of functions and the relative importance of functions are not congruent with the theoretical model. Therefore, either the theoretical model needs to be modified and/or the practice needs to be changed.

Order No. 72-4761, 116 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Landers (Last name), Jack (First name), M. (Middle name)

Exact Title THE COMPARATIVE EFFECTS OF TWO LABORATORY APPROACHES ON INFORMATIONAL ACHIEVEMENT, INFORMATIONAL RETENTION AND ATTITUDES IN WOOD TECHNOLOGY AT THE COLLEGE LEVEL.

Degree granted Ed.D., Date 1972 No. of pages in report 154

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To compare experimentally the relative effectiveness of the project approach to laboratory activity and the exercise/experiment approach to laboratory activity on the variables of (1) informational achievement, (2) informational retentiona in wood technology, and (3) attitudes of college students toward wood technology.

Source of data and method of study:

The experiment was conducted using the project approach treatment and an exercise/experiment approach treatment, with twenty subjects in each group. Each group was a section of the course identified a Wood Technology, MF&C 12-10, offered through the Division of Industrial Arts and Technology, Central Missouri State College, Warrensburg, Missouri. The "Non-Equivalent Group" design was employed in order that regular registration procedure could be accepted as the method of assigning subjects to randomly assigned treatment groups.

Findings and Conclusions:

When the groups' mean scores on the post-test of achievement and test of retention were compared, no significant differences were revealed, thus indicating that the type of laboratory activity (project or exercese/experiment) did not have a significantly different influence upon the informational achievement or retention of information by the students.

Upon comparison of the groups' mean score on the post-test of attitude, no significant difference was revealed thus indicating that the type of laboratory activity did not have a significantly different influence upon the attitude of the students.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Langan (Last name), Paul (First name), E. (Middle name)

Exact Title INFLUENCE OF INTERNAL AND EXTERNAL CONTROL OF REINFORCEMENT UPON PARTICIPATION AND LEARNING IN VOCATIONAL EDUCATION

Degree granted Ed.D., Date 1972 No. of pages in report 94

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City. State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To ascertain the influence of internal and external control of reinforcement upon participation and learning in vocational education. A secondary purpose was to ascertain the extednt to which the internal-external variable exerts a differential effect upon male and female students.

Source of data and method of study·

889 eleventh grade students in Proviso West High School served as subjects in the investigation designed to ascertain the relationship between student attitude toward internal and external control of reinforcement nd student particiaption in vocational education.

Findings and Conclusions·

1. That sex was not a determinant of externality and that the internal-external variable did not exert a differential effect upon male and female students.

2. Supported was the assumption that "internals," students who view reinforcment as being contingent upon their own behavior, recall more directly and indirectly related occupational information than " externals," students who view reinforcement as being dependent upon others.

3. That "internals," both male and female, recall more short-term directly and indirectly related occupational information invocationl cooperative education when measured by a modified true-false recall test.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lawson (Last name), Tom (First name), Edgar (Middle name)

Exact Title EFFECTS OF SPECIFICITY AND PLACEMENT OF INSTRUCTIONAL OBJECTIVES ON ATTITUDE AND INTENTIONAL AND INCIDENTAL LEARNING

Degree granted Ph.D., Date 1973 No. of pages in report 134

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1) To determine which of the two types of specificity of objectives promotes the greatest cognitive achievement, intentional and incidental; 2) to ascertain the effect of placement of objectives on cognitive achievement within the two specificity treatments; 3) to determine the effects of the above stated variables on both intentional and incidental retention; and 4) to ascertain influences of 1 and 2 on attitude.

Source of Data and Method of Study:

The instructional materials consisted of 5 written passages dealing with engineering graphics content. The materials were presented to introductory general engineering students from the University of Illinois at Urbana-Champaign. Eighty-four of thes subjects, on which total data were available, were 2x2 multivariate factorial scheme; the combination of (i) specificity of objective and(ii) the placement of objectives within the written passages.

Findings and Conclusions:

The main effects analysis on immediate achievement disclosed that all objective treatments combined were superior to the control group. However, neither level of specificity of the objectives nor their respective placement yielded significant differences among themselves. On retention, the groups which received the specific objectives were superior to those utilizing general objectives. Further anlaysis on immediate achievement indicated that there were no. significant differences produced by the placement variations under which objectives were presented to the subjects. This finding also applied to delayed achievement. Additional analysis disclosed that on immediate achievement, neither intentional nor incidental learning was influenced by either the specificity of instructional objectives or their placement. As measured by delayed achievement, the specific objectives produced higher intentional performance but at the same time did not critically weaken incidental recall. The treatment variations did not produce any significant variation on attitude as perceived by the subjects.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Leavitt (Last name), Murray (First name), Phillip (Middle name)

Exact Title A PROPOSED MODEL FOR THE VERTICAL EXTENSION OF TECHNICAL EDUCATION IN THE COMMUNITY COLLEGE

Degree granted Ed.D, Date 1970 No. of pages in report 220

Granted by University of California -- Berkeley, (Name of institution) Berkeley, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this research is to determine the feasibility of a hypothetical model of vertical extension for technical-vocational education in the community college. In the model, a four-year technical baccalaureate degree will be offered in certain specialized areas within the framework and organization of the comprehensive two-year community college. The increasing complexity of engineering technician training has led several technical institutes to go from the typical two-year program to three years and then to the offering of the four-year baccalaureate degree.

This feasibility study of vertical extension of technical education was undertaken in order to determine the attitudes of faculty, administrators, and students in the community and the state college systems, and industrial personnel toward the offering of the four-year degree in the community college.

The methodological techniques consisted primarily of the questionnaire and the interview. Survey instruments were developed for industrial management personnel, community and state college administrators, community and state college engineering faculty, and community and state college engineering technology students. The selection of institutions and electronics companies for the survey was confined to the San Francisco Bay Area region. All of the public institutions (community and state colleges) were surveyed, and companies were selected utilizing the Standard Industrial Classification System.

Interviews were conducted with members of each segment of the model in order to further probe their ideas and opinions regarding their reasons for support or rejection of the model for vertical extension. The type of questionnaire utilized was a standardized one in which the questions were presented with the same wording and in the same order to all of the respondents. The questions were that of the "fixed alternative" type in which the responses of the subjects are limited to stated alternatives. However, some of the questions were "open ended" to permit some expression without the restrictions imposed by closed questions.

The study was initiated during the summer of 1969, and the collection of data took place between September, 1969, and March, 1969. Three follow-up letters and a series of telephone calls were necessary in order to obtain a satisfactory return of the questionnaires by the respondent groupings as follows: Community College Faculty (85.4 percent); Community College Administrators (85.9 percent); State College Faculty (86.6 percent); State College Administrators (83.7 percent); Community College Students (75.6 percent); State College Students (77.5 percent); and Industrial Personnel (53.6 percent). The nature of the information requested from industry due to its classified status made the response percentage acceptable with some limitations placed upon interpretation of the data.

All of the educational groups support the concept of vertical extension of technical education in the community college, with the exception of most community college administrators. The differences are significant at the .01 level. This group opposes the idea and for the most part are disinclined to display any willingness whatsoever to entertain any suggestions at all on vertical extension. They feel it has no place within the structure and purpose of the community college. Industrial personnel overwhelmingly support the idea of vertical extension in the local community college.

All groups recognize the need for the technician to obtain a baccalaureate degree. In support of offering the four-year program of engineering technology at the community college are an overwhelming majority of community college faculty, state college students, community college students, and industrial personnel. Rejecting this contention are most community college administrators, state college faculty, and state college administrators. The differences are significant at the .01 level. It is important to note that the rejection applies only to the four-year program at the community college and not to the idea of the baccalaureate degree.

All groups overwhelmingly support the utilization of regional consortia as a possible method of avoiding duplication of expensive facilities.

There is a lack of administrative awareness, particularly in the community college, concerning the national shortage of technicians. Industry is cognizant of this shortage, but their willingness to become involved in training is on a rather limited basis.

The spectre of obsolescence, as well as the problem of a continuing shortage of technicians, is omnipresent and should be of equal concern to both industry and the community college. Mutual cooperation must be maintained, and an exchange of information, technical knowledge, and job requirements and new families of occupations must be continually examined by those responsible for educating the technician and for those who employ him.

Recommendations

1. The Master Plan should be redefined and updated by the Coordinating Council for Higher Education.
2. A study should be made on a statewide basis regarding the concept of vertical extension.
3. A study of the cost factors involved to convert a community college to a four-year program in engineering technology should be undertaken with a study of the possible sources and methods of funding, including the Federal Government.
4. A pilot program of vertical extension should be attempted at one school.
5. A study should be made on the attitudes and backgrounds of educators in an effort to develop attitude scales and a possible predictor of their responses.
6. A plan for promoting technical education in the community college should be undertaken replete with plans for implementing this in the high school.
7. A study should be made on selective standards of admission to the four-year degree programs.

Order No. 71-15,695, 220 pages.

SOURCE SHEET FOR SURVEY LIST OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Le Blanc (Last name), Darrell (First name), Robert (Middle name)

Exact Title JUNIOR HIGH SCHOOL STUDENTS AND UNIONS: INFORMATION AND ATTITUDE ASSESSMENT

Degree granted Ph.D., Date 1971 No. of pages in report 178

Granted by Purdue University (Name of institution) Lafayette, Indiana (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to develop a unit of instruction in American labor unions. Instructional content was designed for use in the seventh and eighth grade industrial arts setting. A secondary objective was the evaluation of the instructional unit. Evaluation was conducted in two areas; information assessment and attitude assessment.

The content in the instructional unit was identified through an analysis of pertinent sources including union materials and labor-management texts. Three different teaching modes were used in the sequence of presentations. The final unit consisted of five sections. 1. Unions: what are they? (slide-tape mode), 2. Unions: how they operate. (lecture mode), 3. Unions: obtaining a contract. (lecture mode), 4. Working with the contract. (slide-tape mode), and 5. Future of unions. (programmed instruction mode). Pilot studies were implemented to refine the experimental materials, criterion instrument, and attitude assessment instrument.

Three separate experiments were conducted using intact groups of industrial arts students with a total N = 170. Each experimental situation consisted of an experimental and control group. Six days were required for the study. Both groups were pre-tested on the first day, using both instruments. During the following five days, the experimental group received one section of the unit each day and was immediately tested on that unit of material. On the last day of instruction, the control group was post-tested using the one hundred-question criterion instrument and both groups again responded to the statements in the attitude assessment instrument.

A non-equivalent control group experimental design was used. Data were analyzed through the use of analysis of covariance procedures. Pre-test scores were used as the covariate in the analysis.

Research hypotheses were tested at the .05 level of statistical significance. The following results were obtained:

1. There was a significant difference between the treatment and the control group in each of the experimental situations. When all subjects who had taken the treatment were pooled against all subjects in the control groups there was a significant difference. Statistically significant differences were found on both the criterion and attitude assessment instruments.
2. There was no significant difference between grade levels as measured by either the criterion or the attitude assessment instrument.
3. There was a significant difference between Schools I and III and between Schools II and III. However, there was no significant difference between Schools I and II as measured by the criterion instrument.
4. There was a significant difference in means on the attitude assessment instrument between Schools I and III, but there was no significant difference between Schools I and II nor between Schools II and III as measured by the attitude assessment instrument.

It was concluded that the instructional unit developed for this study was effective in teaching an understanding of labor unions in an industrial arts setting. A significant shift in attitude took place as a result of exposure to the instructional unit.

Order No. 72-7985, 178 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lee (Last name) Raphel (First name) D.C. (Middle name)

Exact Title RELATIONSHIP OF SELECTED DEMOGRAPHIC CHARACTERISTICS AND THE JOB SATISFACTION OF INDUSTRIAL ARTS TEACHERS

Degree granted Ed.D., Date 1972 No. of pages in report 140

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To ascertain: (1) the possible influence of selected demographic variables on job satisfaction and importance variables, (2) the relationships between job satisfaction and job content and context factor satisfaction, and (3) "satisfaction" and " importance" ratings of job content and context factors.

Source of data and method of study

The data were collected through mailed survey instruments. The instrument used for securing data describing the independent variables was a Demographic Information Form. A modified Job Attitude Questionnaire was used for gauging the job satisfaction variables.

Findings and Conclusions

1. That there were statistically significant relationships between overall job satisfaction and job content and context factor satisfaction measures.
2. Findings revealed that there were significant realtionships between "importance" and "satisfaction" ratings of job content and context factors.
3. That only 9 per cent of the teachers were generally dissatisfied with their profession of industrial arts teaching.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Levande, James, Stanley
(Last name) (First name) (Middle name)

Exact Title AN APPLICATION OF PIAGET'S THEORY OF SPACE AND GEOMETRY TO LEARNING ORTHOGRAPHIC PROJECTION CONCEPTS

Degree granted Ph.D., Date 1972 No. of pages in report 114

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To apply Jean Piage's theory of space and geometrical cognition to learning and instrucation of pictorial communication in a coeducational middle school industrial arts program. The investigation focused on examining the facilitation of learning and the stimulation of the sensory-motor and infralogical systems as outlined in the theory. A series of puzzles and games was used to present the concepts of point, line, plane and form. Teh line of clasic construction in geometry - topological, projective and Euclidian and the parallel scheme of the theory's developmental stages provided for the study's theoretical foundation.

Source of Date and Method of Study:

The industrial arts program of the East Lansing, Michigan, middle schools was the setting for the investigation. The sample was drawn from the beginning industrial arts classes in the two schools and consisted of 163 students, 95 boys and 68 girls.

Data analysis consisted of univariated and multivariate analysis of variance of gain scores on the pre-test and post-test instruments and an analysis of the correlations between gain scores and reading test scores.

Findings and Conclusions:

The study indicates that the stimulation of the sensory-motor and infralogical systems did not occur under the treatments and conditions in the design. The significant correlational relationship between reading test performance and the performance on the spatial and visualization tests suggests that consideration be given to the reading abilities of students in the instruction of orthographic projection. A casual relationship between these factors would lend strength to this suggestion. The data does suggest that this reading ability factor should not be discounted until the casual relationship is established or dismissed in further research.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lien (Last name), David (First name), Alvin (Middle name)

Exact Title PROBLEMS AND PROFILES OF ADMINISTRATORS OF OCCUPATIONAL EDUCATION IN RURAL WESTERN PUBLIC COMMUNITY COLLEGES

Degree granted Ed.D., Date 1972 No. of pages in report 114

Granted by University of California-Los Angeles (Name of institution), Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to determine the profiles, problems, programs, and administrative ranking of the administrators of occupational education in rural western public community coileges. It was hypothesized that occupational education is severely restricted and it has few full-time administrators who occupy positions at a level equal with those administering academic subjects. Some of the problems they encounter are directly related to their own profiles.

METHOD OF RESEARCH: The mass-survey method of research was employed. Questionnaires were mailed to the directors of occupational education at the 40 community colleges meeting the definition of rural, public and western. In addition, 7 of the colleges were personally visited to corroborate and supplement data furnished by the questionnaires.

FINDINGS: The composite administrator is 43 years old, has the title of director, has an undergraduate major in agriculture and a master's degree in vocational education. He graduated from a comprehensive high school somewhere in the west in a town of less than 5,000 population, and does not plan further degree-oriented education. He has 7 or more years of experience outside the field of education but not in a field requiring special licensure. He is engaged full time as an occupational administrator, works on an 11-month contract for a salary of $18,000 at a college which awards faculty tenure. He is a member of the American Vocational Association and his state vocational education association.

The occupational program offered at his college is limited, but probably offers auto mechanics, data processing, agriculture, distributive education, electronics, and the office occupations. In addition, several MDTA or other specialty short-term programs are in progress.

The major problem confronting him as he attempts to implement his program is the lack of status and prestige for vocational education. Second most important is his feeling that the Federal government is not as effective a force in vocational education as it might be, followed by the lack of vocational guidance meeting the critical needs of the area. He has no problem finding qualified teachers and there is no serious conflict in the college between occupational and academic faculty or administration. The long distance from his rural college to a university is a significant problem in the upgrading of his faculty.

The town in which the college is located is over one hundred miles from a city of 50,000 people. Its total service area has a population of 37,000 people. The dominant economic force is agriculture, and 82 per cent of the feeder high schools are supportive of the college. There is no visible urban influence on the occupational curriculum, which counts 37 per cent of the student body as vocational majors. The administrator reports to the academic dean, or dean of instruction on a line basis.

CONCLUSIONS: As a result of the study, it can be concluded that about one-half of the colleges in the population offer a program comparable to similarly sized colleges in urban areas, and the program is administered by an adequately prepared administrator. The other one-half of the colleges seriously need to reevaluate their commitment to occupational education, both in terms of quality of program and the qualifications of their occupational administrator.

Order No. 72-18,131, 114 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lindemeyer (Last name) Ray (First name) S. (Middle name)

Exact Title A SCIENTIFIC APPROACH TO THE SOLUTION OF TECHNICAL PROBLEMS WITH APPLICATION TO TWO TECHNICAL-EDUCATIONAL PROBLEMS

Degree granted Ed.D., Date 1954 No. of pages in report 116

Granted by Bradley University (Name of institution) Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

...ngineering is essentially a problem-solvin... pro-
...em. S...n problems as concern the engineer are
...g ...eral types. The first of these may ... re-
...d to as being applied or practical in natu...
...the other is frequently termed basic or ...-
...
...ion. The primary objective of this ...eport
... definition of the ways in which two ty... -
...ems were ...ved by the invention and as...ely
...o ...me. ...oblem one describes a ro... -
...y ...ctor device and is given as an exam... of
...plied type of research, while problem ... deals
...he design ... development of a specific ... -
...ion some ...ment for testing will be ... -
...ed and is therefore given as an example ... ic
...mental research. The value of this ...rch
...ould be applied to education in general an... -
...ar ... ...ion in particular can be readily ...er-
..., ... this study.

...he first ...apter is composed mainly of ...mary
... in the area of problem-solving, in whic...
...objectives were to investigate the type of person best
...d to problem-solving, his education and training, and
...the ...ds that could be developed in solving technical
problems.

The results of this preliminary study were two-fold. First, a list of attributes characteristic of a ...son who will likely succeed in solving technical ...blems was established, and second, a problem-solving ...ethod was developed. The findings were helpful in ...olving the two educational problems presented ... the following chapters.

...In the second chap... ...ion of practical value is pre... ...ple of the "applied" type of re... ...search. ...ion is an invention by the ... ...ing ...stem for grading. With the con...

...ing ...ems to re... ...ing ...ing ...ing

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Linhardt (Last name), Richard (First name), Edward (Middle name)

Exact Title EFFECTS OF SELECTED INSTRUCTIONAL VARIABLES ON STUDENT ATTITUDE TOWARD SHOP SAFETY

Degree granted Ph.D., Date 1971 No. of pages in report 82

Granted by University of Missouri (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The study had the primary purpose of determining the significance of safety attitudes in teaching shop safety. The methods used in the study were: intensive instructional shop safety unit, series of safety films and enforced shop safety. Other inherent variables studied in the investigation were: mechanical comprehension and SCAT scores; SCAT scores and safety attitude pretest scores; SCAT scores and safety attitude change from pretest to posttest; mechanical comprehension and pretest scores; and mechanical comprehension and change in attitude from pretest to posttest.

METHOD

The population of the study consisted of 36 students who enrolled through the regular registration procedures for Agricultural Engineering 60, Shop Tools and Processes, offered at the University of Missouri-Columbia during the Winter Semester of 1971.

A three-treatment group, pretest-posttest experimental design was selected to test the variables investigated in the study. The independent variables consisted of three different instructional techniques designed to develop favorable shop safety attitudes among college students. The three methods were: (1) a three-week intensive course on shop safety, (2) a three-week intensive course on shop safety plus a series of films on safety, and (3) a three-week intensive course and a series of safety films plus enforced shop safety. The dependent variables were two forms of an attitude test.

Analysis of covariance was used to test the significance of differences between treatment groups. A related sample t-test was used to test changes in student attitude between the pretest and posttest. The least significant difference test was used to determine significance among treatment means.

FINDINGS

The intensive instructional shop safety unit did not significantly change attitudes toward safety. The intensive instructional shop safety unit in addition to the series of safety films changed attitudes significantly.

There was a significant difference among the three methods of teaching shop safety. The series of safety films in addition to the intensive instructional shop safety unit was the best method for developing safety attitudes among college students enrolled in a basic shop skills course.

There was no significant correlation between mechanical comprehension and safety attitude, intelligence and safety attitude, and mechanical comprehension and safety attitude. Nor was there a significant correlation between mechanical comprehension and intelligence.

CONCLUSIONS

Conclusions which can be inferred from the findings of the study are:

1. Although the conventional lecture demonstration method of teaching shop safety has been used for a number of years, this method did not change safety attitude significantly and should be supplemented with actual accident films.
2. Since there was little or no correlation between intelligence and safety attitude, it would seem that scholastic aptitude or intelligence, within the limits of intelligence and SCAT scores in the study, are of no serious consequence in developing safety attitudes.
3. Those students who are mechanically inclined, do not possess attitudes which are significantly more favorable toward safety than those who are less mechanically inclined.
4. Students working in the shop under strict supervision in this study did not maintain their attitudes toward safety. The attitudes seemed to regress toward the attitudes held before they were changed by the intensive instructional shop safety unit and a series of safety films.
5. Students' mechanical comprehension or scholastic aptitude do not appear to be significant factors in changing safety attitude.

Order No. 72-10,630, 82 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Lopez (Last name), Guillermo (First name), _____ (Middle name)

Exact Title VOCATIONAL CURRICULUM PLANNING IN THE SECONDARY SCHOOLS

Degree granted Ed.D., Date 1970 No. of pages in report 144

Granted by University of California, (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The public school districts in the State of California are under increasing pressure to provide relevant vocational education programs in a time that is characterized by a rapid rate of change. Although school districts have received financial assistance through federal legislation to cover the supplemental costs of vocational education, there is ample evidence suggesting that much in vocational education is not relevant to the needs of the sectors served. In view of this discrepancy, the Vocational Education Amendments of 1968 (VEA 68) included as a condition for the receipt of federal funds, the need to develop district-wide plans for vocational education at the local level.

Numerous researchers have suggested that approaches generated from the systems concept and considered successful in industry, engineering, and the military, be applied to the planning and management of the educational enterprise. More evidence has been needed, however, to establish the validity of the usefulness of system analysis in such planning. Based on that need, this study focused upon two basic problems, namely, to adapt the processes of systems analysis in the development of a recommended model for vocational curriculum planning, and to assess the effect of extensive personnel involvement in such planning. The latter problem was the basis for the following hypothesis that was tested in this study: There is a statistically significant correlation between ranked effectiveness of the planning of a vocational education curriculum and the extent of personnel involvement in such planning.

For the testing of this hypothesis, and with the assistance of personnel from the California State Department of Education, the writer developed and validated the following: (1) an *Instrument to Review the District-Wide Plans*, (2) *Instructions for Reviewing the District-Wide Plans*, (3) a *Recommended Model for Vocational Curriculum Planning*, (4) *Criteria by Which to Execute Steps in the Planning Model*, (5) *Functions in a 20-step Vocational Curriculum Planning Model*, and (6) an *Instrument to Rate the Extent of Involvement in Vocational Curriculum Planning*.

Using the first instrument, two judges independently reviewed the district-wide plans for vocational education of twenty-three school districts throughout the State of California that were selected to constitute the sample population. Similarly, respondents from each of the twenty-three districts rated on the other instrument their extent of involvement in the development of such plans. The writer used the data generated by the reviewers and the respondents to rank the twenty-three districts according to the base criterion (effectiveness in planning) and the extent of personnel involvement in each of the five phases in the recommended model for planning and in the total planning effort. The writer then applied the Spearman Rank Correlation Coefficient Formula to the rankings. The correlations between the base criterion (effectiveness in planning) and preplanning was .89, planning .96, program development .81, evaluation development .72, budget development .78, and for the total score for all five phases .95. All of these correlations are significant at the .01 level.

Based on the high correlations in the analysis of the data, the hypothesis is tenable. It is safe to predict that a school district that demonstrates a high degree of personnel involvement in functions related to pre-planning, planning, program development, evaluation development, and budget development as defined in this study, is more likely to be a district in which effective vocational curriculum planning is taking place, than a district that does not demonstrate this involvement.

The study adapted and defined in rather precise terms in a recommended model those concepts of system analysis that would generate effective vocational curriculum planning. The evidence presented here tends to support the thesis that there is value in applying the systems concept to vocational curriculum planning. Those responsible for vocational curriculum planning can use the phases, steps, and functions as a model they might implement if they desire to generate an effective vocational education curriculum. Similarly, personnel in the Vocational Education Section, California State Department of Education can continue to use the *Instrument to Review* . . . while reviewing the district-wide plans. Additionally, school administrators may use the *Rating Instrument* . . . to obtain an index relating how the district planning endeavors—both personnel and functions—are operating as an integral unit.

Order No. 71-16,339, 144 pages.

SOURCE LISTING OF RESEARCH STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Loveless (Last name), Austin (First name), G. (Middle name)

Exact Title BACKGROUND AND ECONOMIC STATUS OF THE UNEMPLOYED OF ST. FRANCOIS COUNTY, MISSOURI AND THEIR ATTITUDES TOWARD RETRAINING

Degree granted Ed.D., Date 1962 No. of pages in report 153

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To ascertain the background and economic status of the longterm unemployed of St. Francois County, Missouri, and also their attitudes toward retraining and the possibility of having to change their place of residence in order to find employment.

Source of data and method of study·

Data for the study were obtained from an interview schedule used in a series of two hundred personal interview, conducted in the Flat River Office, Division of Employment Security. These interviewees were a random sample of these individuals who had been unemployed ten weeks or more.

Findings and Conclusions·

The long-term unemployed of St. Francois County are Likely to be long-time residents of the county between the ages of 20 and 50. Most of them will probable be married and the greater number of their children under 18 years of age.

A large percentage of the unemployed will likely mot have had any formal schooling past the tenth grade and few of them will have had any vocational training for their stated chidf occupation.

About half of the unemployed will likely either own or be buying a home and a large percentage of them will likely either own or be making payments on an automobile.

The largest unemployed occupational groups--the miners whose skills are no longer in demand and laborers who have never learned a skill--are most in need of some type of training.

The occupational groups connected with the construction industries will likely include skilled workers whose employment is seasonal in nature and their unemployment problem probably should not be considered critical.

It is likely that less than half of the unemployed will be interested in retraining for a different occupation. Those not interested in retraining are likely to be influenced by the number of weeks they have been unemployed and their opinion regarding future employment possibilities in the county.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Luetkemeyer (Last name), Joseph (First name), Fredric (Middle name)

Exact Title AN EXPERIMENTAL STUDY COMPARING THE RELATIVE EFFECT OF IMMEDIATE AND DELAYED MEASUREMENT OF RETENTION OF PRINCIPLES OF ARCHITECTURAL DRAFTING

Degree granted Ed.D., Date 1961 No. of pages in report

Granted by University of Illinois (Name of institution), Urbana-Champaign, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To investigate the relative effect of immediate and delayed measurement on retention of meaningful, technical material.

Source of data and method of study:

The testing pattern for six treated groups followed a time sequence of immediate, one hour, four hours, twenty-four hours, one week and eight weeks after instruction.

The ten experimental groups concicted of 240 subjects selected from an eighth-grade class of a large metropolitan junior high school. The retention test was classified into the three categories of a) knowledge, b) translation and c) interpretation as defined in the Taxonomy of Educational Objectives. Each category was measured separately and then combined into a total score, making four scores abailable for each group.

Findings and Conclusions:

1. In the initial test, the groups tested immediately after instruction and on hour later are superior in total retention and the three subscores of a) knowledge, b) translation and c) interpretation as compared to the groups tested at four hours and twenty-four hours.

2. The instructed groups tested within the first twenty-four hours and at one week are superior to the instructed group tested only at one week in total retention and the three subscores of a) knowledge, b) translation and c) interpretation. The instructed group testen only at one week is superior to the control groups in the areas of total retention and a) knowledge.

3. Eight weeks after instruction, the six instructed groups are superior to the four control groups in total retention.

4. Intesting the main effect of sex, a significant difference in total retention and a) knowledge was found at one week. In both cases, the differences favored the male subjects. At eight weeks a difference was found in the subscore c) interpretation, which in this case, favored the females subjects.

5. In regard to the interaction of sex, levels and time over the entire experiment, there were eleven two-factor interactions and no three-factor interactions. Ten of the two-factor interactions occorred in the total score and the subtest knowledge at twenty-four hours and one week.

6. Except in a few limited situations at eight weeks, there was no apparent learning taking place within the four control groups whether the group received the test one, two or three times.

SOURCE SHEET FOR SURVEYS OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Luff (Last name), Andrew (First name), Charles (Middle name)

Exact Title AN ANALYSIS OF THE FUNCTIONS AND TRAINING NEEDS OF INDUSTRIAL SUPERVISORS

Degree granted Ed.D., Date 1955 No. of pages in report 182

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to analyze the functions and training needs of industrial supervisors to ascertain (1) what emphasis should be placed on instructional units designed primarily for individuals seeking a career in industrial supervision, and (2) to make available to individual companies, supervisory personnel, and other interested individuals an analysis of functions performed and training needed by supervisors as differentiated by various selective criteria.

To achieve the objectives of this problem, a letter was sent to various interested individuals asking them to submit lists of the duties, responsibilities, and training needed by industrial supervisors with whom they had close contact.

From the lists which were submitted, a questionnaire was prepared. This questionnaire was sent to 1,172 supervisory personnel throughout the State of Michigan. Of this number 894, or 76.4 percent, were returned. The respondents to this study represented thirty-three different companies engaged in seven types of industries.

In order to analyze the duties and responsibilities of supervisors, thirty-five functions were submitted to industrial supervisors for appraisal. The supervisors were asked to check these functions: first, to indicate whether they performed the function, and second, to indicate the importance they attached to each function.

To secure a more complete picture of the educational program required, the supervisors were requested to indicate whether or not training of the kind outlined in the questionnaire should be provided. Twenty-one training items were submitted for appraisal. The respondents were asked to indicate the importance they attached to each item.

An item analysis was prepared for each function. The item analyses gave a measure of the relative extent to which each of these functions were performed and provided an indication of the importance which was attached to each of them.

An item analysis was prepared for each item of training needed by industrial supervisors. An analysis was also made of the importance attached to the various items of training by the respondents.

The selected criteria used in this study are:

Level of supervision
Years of experience as a supervisor
Number of employees supervised
Size of company (employees)
Regular supervisory meetings
Union status of workers
Age of supervisors
Formal education (grade level)
Special training

The functions which are most generally performed and may be considered most important are:

Issuing instructions and orders
Training people
Improving morale
Smoothing out misunderstandings
Carrying out instructions

The items of training which are most generally needed and may be considered most important are:

Training in the principles of employee-employer relations
Training in the psychology of human relations
Training in the duties and responsibilities of a foreman
Training in the underlying causes of labor problems
Training in writing reports
Training in industrial safety
Training in first-aid procedures
Training in the basic principles of speech

182 pages. $2.28. Mic

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Luy (Last name), Jack (First name), A. (Middle name)

Exact Title BACKGROUNDS, OCCUPATIONAL ASPIRATIONS AND ATTITUDES OF UNEMPLOYED YOUTH IN A MDTA PROGRAM IN ST. LOUIS, MISSOURI

Degree granted Ed.D., Date 1964 No. of pages in report 165

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To investigate and describe the social, economic, and educational backgrounds as well as the occupational aspirations and attitudes of the unemployed youth enrolled in the MDTA, MO 59 youth project in St. Louis, Missouri.

Source of data and method of study.

Data for the study were obtained throught the use of an interview schedule constructed for the purpose of interviewing the 224 youth included in the study, and from the results of the GATB administered to these youth by the Missouri Division of Employment Security.

Findings and Conclusions.

1. With respect to residential mobility, these youth tended to be a relatively stable group.
2. "Moral-social" experiences of these youth were not the type normally found among youth of similar ages.
3. It is highly probale that their lack of formal education and vocational training was a contributing cause of their unemployement.
4. Family backgrounds of these youth were not characteristic of those normally associated with well adjusted home life.
5. Guidance services available to these youth were not geared to meet their needs, or the youth did not recognize the value of such services.
6. Remedial programs necessary to assist this type or youth in overcoming deficiencies in reading and study habits appeared to be lacking.
7. Opportunity fof job training was not availble to these youth or they had not taken advantage of available training.
8. These youth appeared to realize, at least to some extent, the values inherent in an education.
9. The youth appeared to hold fairly realistic views regarding their future economic life.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Mac Arthur (Last name), Earl (First name), William (Middle name)

Exact Title FACTORS AFFECTING LONG RANGE OCCUPATIONAL EDUCATION PLANNING IN PUBLIC SCHOOLS, TWO YEAR COLLEGES, AND BOCES AREA CENTERS IN FIVE NEW YORK STATE COUNTIES

Degree granted E.D., Date 1971 No. of pages in report 246

Granted by Corniell University (Name of institution) Ithica, New York (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

This study was designed to determine the influence certain identified factors would have on long range occupational education planning. The study was conducted in five counties in the southern tier of New York designated as Region 11 in New York State Plan for Occupational Education in which a regional plan had been completed in 1970.

Data were collected through mailed questionnaires from chief administrators of 41 public school districts and five BOCES (Board of Cooperative Educational Services) area occupational centers. Interviews were conducted, utilizing the same instrument, with three district superintendents, two two-year college presidents, and state education officials of the State Education Department and the State University of New York.

Respondents rated twenty-two identified planning factors as to positive or negative influence according to a scale ordered from -5 to +5. Written reasons in support of the ratings were indicated by the respondents. Mean factor scores were determined and the factors rank ordered from highest mean score to lowest mean score. The five highest scores were considered strongly positive in their effect on long range planning. The five lowest scores were considered strongly negative in effect. Positive scores indicated the factor facilitated the planning process. Negative scores indicated the factor restricted long time planning. Comparisons of factor influences were made on the basis of public school size, type of administrative organization, and geographical location.

The data of this study indicate that the factors affecting long range occupational education planning may be categorized as "public", "operational" and "administrative".

The "public" factors derive their influence from individuals or groups not directly associated with the educational system: parents, employers, legislators, and other publics. A positive and supporting attitude by these publics facilitates planning; a negative attitude restricts planning. These publics, when positively oriented, are effective in providing public support for occupational education, particularly financial support.

The "operational" factors involve the individuals and groups within the educational system: administrators, teachers and students. The attitude of the chief school administrator, in a positive and supportive manner, was determined as the single most effective factor in facilitating planning. Conversely, the attitude of public school academic teachers, as rated by administrators, is, in the main, negative. This negative attitude of academic teachers restricts occupational program planning.

It was concluded that effective long range occupational planning should be initiated with a determination of the attitudes of these groups: parents, teachers, employers, students and administrators. Knowledge of these group attitudes will enable a planner to be more effective in developing a long range plan.

The "administrative" factors include activities associated with services to students and program organization. Factors in this category identified as having the most restrictive effect on long range planning are those which are regarded as current problems by administrators. Regulations, mandates, program scheduling, transportation scheduling, and the need for specialized equipment exert strong restrictions on long range planning. From this evidence, it was concluded that the planning process is not well understood, since, by definition, a plan offers solutions to administrative problems.

Counseling for occupational students is considered an important factor in occupational education program planning. However, it was determined that current counseling practice is considered more academic than occupational. Counseling practice, to be more effective in occupational education, will require changes in counselor orientation and pre-professional education programs.

The process of long range occupational education planning is in its infancy and neither the process nor the ramifications of a long range plan are well understood by the participating administrators. The process needs refining. This refinement can be achieved by better informing administrators of the purposes of planning and their developing a greater understanding of the process. Without such understanding and involvement, long range occupational education planning will be of little value.

Order No. 72-18,559, 246 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McCage (Last name), Ronald (First name), Dale (Middle name)

Exact Title A COMPARISON OF THE USE OF SLIDES AND MODELS TO THE CONVENTIONAL METHOD OF INTRODUCING DESCRIPTIVE GEOMETRY CONCEPTS

Degree granted Ed.E., Date 1970 No. of pages in report 228

Granted by Texas A&M University (Name of institution), College Station, Texas (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of the Research.—The purpose of this research was to determine the effectiveness of using slides and models as compared to the conventional lecture-demonstration method of presenting introductory concepts of descriptive geometry as applied to practical engineering situations. Industrial sites and models provided the photographic setting for 35mm slides illustrating engineering and industrial applications of descriptive geometry principles.

Procedure of the Research.—A total of 6,015 samples were taken from a total population of 362 engineering graphics students at Texas A&M University during the Spring Semester of 1970. The 362 students were divided into two groups designated as experimental and control.

The major hypothesis of the study was that photographic slides supplemented by realistic models would be more effective than the conventional method of introducing descriptive geometry concepts as applied to practical engineering problems. The major hypothesis was tested by four null hypotheses which stated that there would be no significant difference between groups in student's achievement, student's ability to visualize spatial relations, student's preference of methods, and instructor's utilization of presentation time.

Separate methods of testing were developed for each null hypothesis. Achievement differences were compared by using a comprehensive descriptive geometry examination which served as the pre-test and post-test. In addition to the comprehensive examination, regular departmental weekly quizzes and over-all semester grade averages were compared.

Visualization of spatial relations was tested by using Part II of the comprehensive examination and a specially designed slide test based on the principle of slide construction used for the study. To determine student preferences of teaching methods, a questionnaire was administered at the end of the study. Utilization of presentation time was compared by taking random time samples throughout the semester. All instruments and materials were evaluated and validated by a faculty jury. All tests were graded uniformly with the aid of grading keys. The pooled t-test of equal means and the F-test of equal variances were used to arrive at the statistical differences between the two groups.

Conclusions of the Research.—Student achievement was tested by two methods. A significant difference at the .01 level of confidence was found on the comprehensive post-test. Weekly quiz scores proved significant differences beyond the .001 level while the over-all semester grades showed no significant difference.

Student's ability to visualize was tested by two methods with significant results on both. Part II of the comprehensive examination showed significant difference at the .10 level of confidence while the slide visualization test produced the most positive results of any test given. It produced a mean difference of 6.749 and a t-score of 3.8003 in favor of the experimental group method which was significant at beyond the .001 level of confidence.

Student's preference of methods was tested by the use of a questionnaire. In the analysis of the fifteen items used, the experimental group was neutral on two items while the control group was neutral on eight items. On thirteen of the fifteen statements, the mean response favored the experimental slide method. Student preference of the two teaching methods showed that 92.4 per cent of the experimental group preferred the slide method in contrast to 83.6 per cent of the control group. This is significant in favor of the experimental method.

The experimental method took an average of twelve to thirteen minutes longer to present. This was significant in favor of the conventional method. Even though more time was required by the experimental approach, both participating students and instructors agreed that the extra time was well spent in terms of student achievement and interest in the course.

The major hypothesis of the study was accepted since three of the four null hypotheses were rejected and the fourth hypothesis was justified. Based on the findings of the study, eight recommendations were made for further research.

Order No. 71-8932, 228 pages.

SOURCE SELECTION FOR ABSTRACTS OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McClellan (Last name), Larry (First name), Dean (Middle name)

Exact Title AN INVESTIGATION OF THE OPINIONS OF THE MEMBER OF THE NINETY-FIRST CONGRESS TOWARD INDUSTRIAL ARTS

Degree granted Ed.D., Date 1971 No. of pages in report 161

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

It was the primary purpose of this study to secure the concepts of industrial arts as held by the members of the Ninety-First Congress.

Procedure

Twenty jury-selected concept items were identified from a list of sixty for inclusion in a Congressional opinionaire. Opinionaires were sent to each of the five hundred thirty-five members of the Ninety-First Congress. Thirty-one per cent or one hundred sixty-six Congressmen responded. Each opinionaire item solicited one of the following responses: strongly agree, agree, disagree, or strongly disagree.

Legislators were separated into five variables: political affiliation, geographic area represented, age, occupational background, and educational background. Variables were divided into seventeen categories: Republican, Democrat, New England, East, Midwest, South, West, over age 50, under age 50, professional, white collar, blue collar, laborer, high school, bachelors, masters, and masters plus.

The most suitable method for testing the data provided by the opinionaire was the standard deviation measure of variability. Data was generated in the form of percentages, means, and standard deviations which allowed the researcher to determine relationships, group characteristics, and causal circumstances among the concept items and the legislative categories.

Selected Findings

The following observations present major findings resulting from the detailed analysis of legislative responses to the opinionaire. Legislators agreed concerning the following:

1. Industrial arts is *not* a phase of general education.
2. Industrial arts is *not* primarily for students with low academic abilities.
3. Industrial arts is *not* funded under the vocational education acts.
4. Industrial arts is another name for manual training.
5. Industrial arts uses the construction of a woodworking project as the primary teaching vehicle.
6. Industrial arts should provide realistic training with modern up-to-date industrial equipment.
7. Industrial experience provides the most realistic laboratories for the preparation of industrial arts teachers.
8. Industrial arts should provide students with an introduction to the multiplicity of career opportunities.
9. Industrial arts is *not* more relevant than liberal arts education because of our industrial-technological society.
10. Federal aid is necessary for industrial arts to grow and prosper.

Selected Conclusions

1. National legislators do not agree with the commonly accepted objectives of industrial arts as established by the *Guide to Improving Instruction in Industrial Arts, 1968.* They believe that industrial arts is not general education and not vocational education. This implies that industrial arts belongs to neither recognized purpose of education but is isolated and separate according to legislators.
2. Industrial arts should be a part of all junior high and secondary public school programs.
3. The stigma of manual training distorts the image of industrial arts relative to established concepts of industrial arts currently held by industrial arts leaders.
4. Industrial arts must stress the interpretation of all American industry as well as the woodworking segment.
5. Industrial arts must acquire modern up-to-date equipment to provide realistic training, insight, and understanding of American industry.
6. Industrial arts must include industrial work experience and industrial internship programs in the preparation of industrial arts teachers.
7. Industrial arts has failed to convey its importance when compared to liberal arts.
8. Legislators indicate industrial arts is not funded under the vocational education acts and should be funded in order to grow and prosper. This seems to provide a favorable climate for industrial arts lobby groups to secure more federal aid for the field of industrial arts.

Recommendations

1. Research should be conducted to determine means of establishing effective communication channels between industrial arts interest groups and state and national legislators.
2. Research should be conducted to determine effective methods of improving industrial arts public relations at the local, state, and national levels.
3. Research should be conducted to determine effective methods of lobbying for state and federal support.

Order No. 72-13,322, 161 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McClure (Last name), Clois (First name), Aubrey (Middle name)

Exact Title THE DEVELOPMENT OF A COUNSELOR'S GUIDE FOR USE IN SELECTIVE PLACEMENT OF STUDNETS IN A DRAFTING TECHNOLOGY PROGRAM

Degree granted _____, Date _____ No. of pages in report 169

Granted by Utah State University (Name of institution), Logan, Utah (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study The purpose of this study was to develop a counselor's guide consisting of identifiable aptitudes cr factors in the educational background of drafting technology students who successfully complete the drafting technology program at the College of San Mateo.

Source of data and method of study. The sample was limited to students who entered the two-year technician program at the College of San Mateo with a major in drafting technology. The sample was divided into six groups according to the student's educational and occupational accomplishments after entering the program and totaled 200 observations. A total of 27 prediction factors were examined for each student. A computer was used to statistically treat the data by the multivariate procedures.

Findings and Conclusions: Factors that were found to be of little or no value in predicting student success in drafting technology at the College of San Mateo were: 1. Previous college attended; 2. High school graduation rank and grade point average; 3. Achievement at high school level in mathematics, English, social studies, and industrial arts/vocationa education; 4. GATB test in the areas of verbal, clerical perception, and motor coordination; 5. The verbal and quantitative areas tested in SCAT tests.

The five aptitude factors that proved valid for predicting student success at the .01 level of confidence were: 1. Intelligence, GATB; 2. Numerical, GATB; 3. Spatial, GATB; 4. Form perception, GATB; 5. Manual dexterity, GATB.

Two aptitude factors, finger dexterity, GATB, and SCAT-total, although not signigicant at the .01 level of confidence, were strong enough predictors to warrant their being included in the counselor's guide.

Based on a cross-validation of the findings of this study, it was concluded that the following eignt factors are valid for use in the counselor's guide: 1. Intelligence, GATB; 2. Numerical, GATB; 3. Spatial, GATB; 4. Form perception, GATB; 5. Finger dexterity, GATB; 6. Manual dexterity, GATB; 7. Score on the SCAT-T; 8. High school science level of achievement.

Additionally, it was concluded that success in the drafting technology program at the College of San Mateo required greater abilities as measured by the GATB scores than employment success as indicated by national norms.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McCrorie (Last name), Thomas (First name), R. (Middle name)

Exact Title A STUDY OF EDITORIAL OPINION REFLECTING TRENDS IN VOCATIONAL-INDUSTRIAL EDUCATION IN THE UNITED STATES, 1917-1952

Degree granted Ed.D., Date 1952 No. of pages in report 224

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The study was prep... show the development ... vocational-industrial ... in the United States ... 1917 to 1952. It ... did take actions to con... with the emergency ... the economic trends in ... during the ... five year period under ... consideration.

Editorials were sel... as major sources of in... formation because they ... are concerned with contem... porary problems. The ... torials were supplemented ... with other materials in ... order to give continuity and ... added meaning to the ...

The study is not a cr... que of the intelligence, vi... sion, integrity, or activ... s of persons involved in ... the promotion of vocatio... l education. It is a report ... of happenings in the fiel... disclosed and reacted to ... in selected educational p... lications. It is limited ... chiefly to matters of su... ficient importance to merit ... the attention of editorial ... writers and to controversial ... issues upon which the w... iters desired to express ... their opinions.

The part of the feder... government in the promo... tion of vocational educ... on is shown through the dis... cussion of federal legis... tion pertaining to vocational ... education and of the fe... al agencies which were cre... ated to administer the ... provisions of the acts. Regard ... is given to the types of ... programs for which the states ... and local communities ... are reimbursed by federal ... funds.

The effects of soci... economic trends upon voca... tional-industrial educ... n were examined. Foremost ... among these trends w... the entry of youth into indus... try at a more mature ... . The changes in vocational ... programs caused by l... ased school life are pointed ... out and possible addi... l changes noted.

Apprentice trainin... ring the period was con... sidered with attention ... ng directed to the dearth of ... apprentices throughou... e years and to the difficul... ties attending the shor... e. Efforts to stimulate ap... prentice training are ... orted.

Emphasis is place... on the results of vocational-... industrial education p... rams during certain periods ... of the time interval s... ned by the study. The con... tributions made in tra... ng workers for war indus... tries and members of ... armed forces for both ... world wars are stres... . Attempts to help the job... less by training them ... new occupations during the ... depression of the 'thi... es' are shown. The role ... played by vocational-i... ustrial education in the in... dustrial growth of the ... ion since 1917 is reviewed.

The necessity for ... expanded program of voca... tional-industrial edu... ion to help meet the vocational ... needs of more people ... discussed. Recommendati... ons were made that ... existing programs be ex... tended downward to ... ude training for semiskilled ... occupations and upw... to include training for tech... nical occupations. C... r measures advocated were ... [illegible] ... [illegible] ... [illegible]

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McDougle (Last name), Larry George (First name), _____ (Middle name)

Exact Title BACCALAUREATE PROGRAMS IN ENGINEERING TECHNOLOGY: ENGINEERING AND TECHNOLOGY ON THE SAME CAMPUS

Degree granted Ph.D., Date 1971 No. of pages in report 241

Granted by The University of Toledo (Name of institution), Toledo, Ohio (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purposes of the Study

The primary purpose of the study was to define the relationship between engineering and technology on the same campus, and to ascertain what techniques were employed to encourage mutual understanding between engineering faculties and students and engineering technology faculties and students. The study had the additional purposes of clarifying (1) the educational direction that the growth of four-year engineering technology programs would take, and (2) industry's reaction to four-year engineering technology programs, and the likely employment opportunities for graduates of these programs.

Sources of Data and Information

Information was required from two sources: (1) those institutions reportedly offering four-year programs in engineering technology, and (2) the industrial community. Questionnaire returns were received from 71 institutions and 17 companies.

Tools and Techniques Involved in Collecting and Analyzing Data

The tools utilized in the study consisted of two questionnaires, one developed to be sent to educational administrators in charge of baccalaureate engineering technology programs, and the other developed to be sent to key personnel in industry. The questionnaire sent to educational institutions was designed by the investigator. The industrial questionnaire was based on one part of a larger questionnaire developed by the College of Engineering at Cleveland State University.

Personal interviews were conducted on three university campuses, with the primary purpose of viewing firsthand the operation of the respective engineering technology programs. Interviews were also conducted with representatives from seven major industries in the greater Toledo area.

The Major Findings

1. The following generalizations could be inferred concerning four-year engineering technology programs located in an institution having a college of engineering on campus:

a. The responding administrators were less inclined to support and advance the development of interdisciplinary programs than were administrators from institutions without a College of Engineering.

b. Program development placed greater emphasis upon the philosophy of depth in a specialty area than did institutions not having a College of Engineering.

c. Administrators from engineering technology programs located in an institution with a College of Engineering were much more concerned with the competition with the College of Engineering for physical space and finances.

d. Engineering technology programs in an institution with a College of Engineering were more inclined toward co-op programs than were engineering technology programs located in institutions without a College of Engineering.

e. Engineering technology programs with a College of Engineering were less inclined to grant credit for apprenticeship training or previous work experience through such mechanisms as advanced placement or proficiency examinations.

f. They also exhibited a very limited interest and emphasis upon the concept of Continuing Education as a significant component of the total engineering technology curriculum.

g. Administrators from engineering technology programs with a College of Engineering on campus were much more concerned with the importance of achieving ECPD accreditation than were administrators from institutions without a College of Engineering.

2. The four-year engineering technology graduate was filling a void between the two-year technician and the engineering graduate.

3. Industry was increasingly more interested in employing technologists instead of engineers for certain types of jobs.

4. Program goals and objectives were shifting toward an increased emphasis in meeting ECPD standards.

5. Four years at a four-year institution leading to the Bachelor of Engineering Technology degree was the preferred curricular plan by responding university administrators.

6. Industrial representatives placed greater emphasis on cooperative educational programs than did university officials.

7. The gap between engineering and engineering technology was closing.

8. Engineering colleges were beginning to make greater efforts to gain control of engineering technology programs.

9. Engineering technology programs were providing serious competition to many engineering programs, with the forecast that four-year engineering technology programs would replace the traditional Bachelor's Degree in Engineering by 1980, with the Master's becoming the first professional degree in engineering.

10. The goals and objectives for a typical engineering technology program generally considered the importance of the following major components:

a. broad liberal education;
b. foundation of scientific principles;
c. area of specialization; and
d. development of communication skills.

11. Specific types of practical experience considered most important for engineering technology faculty members included: "hardware" engineering, especially in the areas of design, development, and quality control; experience in applied design and/or production supervision; production design; engineering management; and industrial consulting activities.

Order No. 72-2156, 241 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McKee (Last name), Ronald (First name), RAy (Middle name)

Exact Title TEACHER DOGMATISM AND EDUCATIONAL PHILOSOPHY AS RELATED TO THE WILLINGNESS OF INDUSTRIAL EDUCATION TEACHERS TO PARTICIPATE IN ACTIVITIES PRESENTING IMPROVED INSTRUCTIONAL PRACTICES

Degree granted Ed.D., Date 1971 No. of pages in report 169

Granted by Utah State University (Name of institution), Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Teacher dogmatism and educational philosophy were studied in relation to the willingness of industrial education teachers to participate in activities presenting improved instructional practices. In addition, dogmatism, educational philosophy, and willingness to participate were also related to the age of the respondent, the total number of years of teaching experience, the number of years in his present position, the number of years in his present district, and the amount of his professional preparation.

To obtain information regarding the various variables of the study, 274 industrial education teachers in the state of Utah completed a research instrument consisting of:

1. Troldahl and Powell's short form dogmatism scale.
2. Kerlinger and Kaya's scale to measure attitudes toward education.
3. Brantner's participation checklist.
4. Six background data items.

In relation to the variables studied, six hypotheses were tested.

The following conclusions were reached as a result of reviewing literature pertinent to attitudes affecting implementation of activities presenting improved instructional practices and the testing of the hypotheses formulated.

The general conclusion of the study is that teachers' attitudes, particularly those associated with dogmatism and educational philosophy, do contribute significantly to the acceptance or rejection of activities presenting improved instructional practices.

In addition to the general conclusion drawn from this study, three other conclusions are drawn from specific findings of the study.

1. The attitude of the teacher involved in educational change plays a major role in his acceptance of innovations in education. In order to accept change, the individual must be open to alternatives.

2. Implementation of activities presenting improved instructional practices have greater possibility for success if accommodations are made for the influence of dogmatism and educational philosophy as an important factor in the acceptance or rejection of such activities.

3. Years of teaching experience is a factor that must be considered when selecting prospective participants for activities presenting improved instructional experience, namely those with one, two, and three years, exhibit a reluctance to participate in such activities.

Order No. 72-4766, 169 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author McLennand (Last name), Bernard Thomas (First name), _____ (Middle name)

Exact Title A DEVELOPMENTAL STUDY OF AUTOMOTIVE PROGRAMS IN TWO-YEAR COLLEGES WITH IMPLICATIONS FOR A PLANNING AND STANDARDS GUIDE

Degree granted Ed.D., Date 1971 No. of pages in report 267

Granted by Texas A&M University (Name of institution), College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was performed for and funded by the Texas Education Agency to assist them in establishing standards and guidelines for automotive programs in two-year colleges.

The development of the proposed planning and standards guide was divided into three phases: (1) the curriculum; (2) the tools, equipment and training aids; and (3) the facility.

The determination of what is to be taught is of primary consideration in an occupational curriculum. The development of the program should be based on the requirements of the knowledge and skills a student should have to work as an automotive mechanic.

Certain parameters for curriculum development were set forth by the *Guide for Planning Post-Secondary Occupational Education and Technical Programs in Texas.* With the parameters and answers to a questionnaire as guides, two automotive curricula were developed. The courses of study provide for intensive training with individual participation of the student in all areas of automotive service and repair including on-the-job-training. The programs were approved by a strong majority of the educational respondents and the automotive service and repair industry participants in preference to an automotive technology curriculum offered by a two-year college.

To have complete training of the individual, the total participation of each student in all phases of job operation is necessary. The tools, equipment, and training aids should be sufficient to permit each student to function at an individual work station. When a man is being trained in a skill trade such as an automotive mechanic, he does not acquire manipulative skills in all areas of job operation while working in or with a group of students. A list of tools, equipment, and training aids, for a class of 18 students was compiled and submitted to the respondents of the two-year colleges. A list of items agreed to by a majority of the participants was itemized and priced.

The curriculum, the class size, and the tools, equipment, and training aids, are the main parameters when designing the individual work stations and the facility. A standard set by the *Southern Association of Colleges and Secondary Schools* advised that the room shall be large enough to properly house the equipment and to provide safe, comfortable, working space for the student. Individual work stations were planned for the subject areas of the automotive curriculum. Option I, "Automotive Service and Repair", 1308 or 1350 contact hours in automotive subjects only, a one year program. The rooms in which the subjects were to be taught were evolved and the total facility was designed in accordance with the parameters.

With the implications for the planning and standards guide were recommendations to increase the effectiveness of the automotive programs in the two-year colleges. The establishing of a maximum number of students per class (18) and a maximum number of class and/or laboratory hours per instructor per week (24) was advised. The inclusion in the proposed guide of the standards set forth by the *Guide for Planning Post-Secondary Occupational Education and Technology Programs in Texas* and the *Southern Association of Colleges and Secondary Schools* was also recommended to provide information to the instructors.

Order No. 72-5731, 267 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Manning (Last name), George (First name), Earl (Middle name)

Exact Title THE RELATIONSHIP BETWEEN CERTAIN LEADERSHIP ATTITUDES AND JOB PERFORMANCE MEASURES

Degree granted Ed.D., Date 1971 No. of pages in report 105

Granted by University of Cincinnati (Name of institution) Cincinnati, Ohio (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Subject of the Study: The central problem under consideration in this study was the relationship between certain leadership attitudes and job performance measures.

The Candidate's Major Field of Study: The major educational preparation of the candidate was in the field of Industrial Education, especially in relation to supervisory and management education.

Purpose of the Study: The purpose of this study was to test the assumption that agreement between subordinate and supervisor on leadership attitudes correlated significantly with performance on the job.

Significance of the Study: The significance of this study was in its attempt to bridge the gap between human relations and job performance theory and practical application. It was held that, to the extent agreement in leadership attitudes between subordinate and supervisor correlated with performance on the job, an employee placement tool would be validated. Both economic and social benefits would be realized.

Individuals Involved in the Study: A total of thirty-three life underwriters and six life underwriter supervisors were included in this study.

Method of Obtaining Information: An opinion questionnaire consisting of thirty-eight items was used to obtain the desired information regarding leadership attitudes. This research questionnaire was derived from 177 initial items representing attitudes toward focus of leadership, style of leadership and organization of leadership. Support for emphasizing leadership attitudes in these areas was found in a review of related literature. Five performance measures were utilized in this study. Two supervisory ratings were obtained by a five-point performance scale and by the paired-comparison rating technique. Three dollar performance measures were obtained by records of average monthly premium received, average monthly volume sold and average monthly lives underwritten over the period of one year, or length of service, whichever was greater.

Findings and Conclusions: It was found that, for this research sample, supervisory ratings were the most dependable criteria to use in predicting future performance, due to the influence of seniority on tangible dollar measures. In regard to seniority, it was found that seniority under one given supervisor correlated more highly than occupational seniority with all performance criteria. In regard to the central problem of the study, it was found that three items out of the original thirty-eight items in the research instrument correlated significantly with the most dependable performance measure. It was also noted that the direction of the correlation contradicted a second assumption of the research study—that agreement on leadership attitudes between subordinate and supervisor correlated positively with high performance on the job.

In summary, it was concluded that limitations of the sample size to some extent, and critical error in the scoring procedure for the research tool to a large extent, were responsible for the failure of the assumption of the study to be supported. Fallacy in the fundamental assumption, itself, is a judgment which is considered possible but appropriate to be withheld until further validation of this and other human relations measurement instruments.

Order No. 72-4337, 105 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Mannion (Last name), Edmund (First name), Joseph (Middle name)

Exact Title DEVELOPMENT OF WORK SAMPLES FOR ASSESSMENT AND EVALUATION OF EDUCABLE AND TRAINABLE MENTALLY RETARDED

Degree granted Ed.D., Date 1972 No. of pages in report 170

Granted by Utah State University (Name of institution) Logan, Utah (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To develop work samples to use in observing, identifying, and evaluating vocational data, specifically work habits, work skills, and elements of the work personality for the individual mentally retarded. The work samples singled out for work evaluation purposes the work habits, work skills, and elements of the work personality possessed by the individual mentally retarded person, that had not been enumerated previously, for use by the counselor.

Source of data and method of study: Sources were the literature on vocational evaluation and habilitation of the retarded; employment patterns of Cache, Rich and Box Elder counties of Utah; and sheltered workshops in Utah and northern California. The study was descriptive and developmental.

Findings and Conclusions: The work sample was found to be a viable instrument in the vocational assessment and evaluation of work habits, work skills, and elements of the work personality of educable and trainable mentally retarded young adults. The work sampl was also found to be an effective tool for identifying worker trait components possessed by clients. Additional findings were that work samples had been used for vocational assessment of the disadvantaged and impoverished, but had not previously been used for evaluation and assessment of the mentally retarded. The time required for assessment fo the mentally retarded was found to be longer than for assessment of the disadvantaged. Work sample assessment was found to have minimum validity but validation methods are currently being reviewed.

A conclusion of work sample development was that it is mever complete but is and ongoing process. It was concluded that the use of worker trait components referenced and defined in the Dictionary of Occupational Titles should be mandated for designing and developing work samples. Concurrent validation of the developed work samples was established following the implementation of reviesions suggested by the panel of experienced work evaluation counselors.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Martin (Last name), Donald (First name), Hugh (Middle name)

Exact Title STANDARDS FOR SECONDARY SCHOOL INDUSTRIAL EDUCATION FACILITIES

Degree granted Ph.D., Date 1971 No. of pages in report 182

Granted by Iowa State University (Name of institution) Iowa City, Iowa (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to develop standards for secondary school industrial education facilities, by seeking out the opinions of experts who could relate to the many aspects of facility planning.

The major objectives of the study were:

1. To review existing standards for secondary school industrial education facilities in order to determine their existence and scope.
2. To evaluate existing standards for secondary school industrial education facilities by comparing them to current professional practices.
3. To develop current standards to be used to evaluate existing secondary school industrial education facilities, to aid in planning for renovation of existing facilities or to aid in planning new secondary school industrial education facilities.

The data were collected with a mailed instrument which was sent to an evaluating jury composed of 25 architects, 16 facility planners and 30 industrial educators throughout the country.

A total of 146 items, distributed among 11 parts, were adopted as standards by the jury. The 11 major parts were: laboratory space, storage and special areas, partitions and walls, floor covering, doors, visual comfort, thermal comfort, exhaust, electrical, plumbing and miscellaneous standards.

The space standards responses indicate smaller spaces than those proposed are acceptable. Square feet as a determination of minimum floor area was disputed.

The jury suggested the emerging concept of centralized office and planning areas will replace the traditional individual office and planning areas. Storage areas defined as a percentage of laboratory areas was an accepted concept.

Jury members agreed that interior partitions are to be non-load bearing, to provide maximum flexibility for change.

Vinyl, vinyl asbestos, carpet and wood were accepted floor coverings for drafting and electrical laboratories. Floor coverings, other than colored concrete, will vary for other laboratories.

Current illumination standards and the use of windows did not have the support of the jury. Consultation with illumination experts must precede planning this important area. Light sources are to be fluorescent, semi-direct or indirect, glare and shadow-free.

Relative humidity range of 30-60% and a year around temperature range of 70°F. to 75°F. were approved.

The jury agreed that all laboratories where fumes and contaminants are generated must have adequate exhausts.

The jury approved 115 volt and 230 volt electrical service, emergency cutoff switches, curcuit overload devices, spare circuits, and a fire alarm system separate from the main electrical system.

Some other items accepted were emergency showers, eye wash stations, fire extinguishers and a sprinkler system for fire protection, sterilization centers for eye protective devices, safety devices on equipment, traffic aisle markings and toilet facilities for both sexes.

Order No. 72-5229, 182 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Martin, Loren, _____
(Last name) (First name) (Middle name)

Exact Title AN ANALYSIS OF AREA INTERESTS AND EMPLOYMENT PROJECTIONS WITH A RECOMMENDED PROGRAM OF STUDY AND EDUCATIONAL SPECIFICATIONS FOR AN AREA VOCATIONAL CENTER IN SAN JUAN COUNTY, UTAH

Degree granted Ed.D., Date 1973 No. of pages in report 270

Granted by Utah State University Logan, Utah
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

to develop a program of occupatioanl education and ancillary services, and to establich the educational specifications for new facilities for and area vocational center.

Source of data and method of study:

Previous studies of the Four Corners area; Surveys of county residents (students, adults, employers; alumni, teachers, and school administrators); Review of occupational outlook in the state, region, and nation; Review of literature concerning currently recommended programs of occupatioanl education.

Findings and Conclusions:

1. The types of training desired by area residents related very closely to the projected job opportunities. This included programs in construction; secretarial; service-repairing; metal, plastics, and electronic fabrication; health occupations; wholesale-retail trade; and recreation-tourism.
2. Surveys of employers indicated that personality traits are as important as manipulative skills in developing employability skills.
3. The most realistic programs of vocational education are based on a K-12 contimuum of experiences.
4. Occupatioanl clustering promotes instructional efficiency and learning correlation.
5. Effective counseling services must include student self-analysis, occupational selection, and placement following training.
6. Because of the background of Indian students (Navajo), experiences must be provided throughout the continum to acquaint them witht the economic system and the wide variety of occupations available.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Massengill (Last name), John (First name), Paul (Middle name)

Exact Title SELECTIONS IN PHILOSOPHY AND PSYCHOLOGY RELATING TO INDUSTRIAL ARTS EDUCATION

Degree granted Ed.D., Date 1952 No. of pages in report 230

Granted by Bradley University (Name of institution) Peoria, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to dis[cover] the role of industrial [arts] in education; to present [basic] concepts from which may be derived sound [principles] in industrial arts education; to show effective [means] by which learning is most wisely guided or [motivated] through industrial arts education; and to present [materials] which are based upon experimentation [in] general educational experiences and which may be applic[able] learning situations.

The selections are presented und[er] the following headings: (1) The Role of Indus[trial Arts] in Education; (2) The Psychological Basis of Indus[trial Arts]; (3) Motor Activities in Industrial Arts; [Considerations] in the Industrial Arts; (5) Education as [an] Integration of Experience; (6) The Positive Contribu[tion] of the Industrial Arts to Education.

The readings in philosophy and [psy]chology which are particularly applicable as guid[es] toward the realization of the special contributions [of] industrial arts to general education are discu[ssed] under these headings: Industrial Arts as Conc[rete] Activity; Industrial Arts as a Social Force; Creat[ivity] as a Psychological Factor; The Nature of Learn[ing]; The Nature of the Individual; Creativity and its S[ignifi]cance in Learning; The Synthesis of the Creative [Act]; Pattern of Skilled Action; Motivating the Inst[inctive] Drives; Purpose Selects the Right Response; I[nte]grity of Interest; Creativity and Integration; [Con]tinuity; Interest; Experience; and Growth. [The] discussion commits us to the provisions of a setting in [which] the best avenues for self-expression are made [for] real experiences appropriate to the level of [maturity] of various age groups.

From the extensive readings a [number] of principles were formulated which reveal cert[ain] conditions which the industrial arts must take [into] account in order to contribute as much as possible [to] the educational growth of the individual.

Where the outcomes of such [a] study are positive there is a corresponding increase in feeling of personal worth and a call to engage in the work of society and contribute something [of] value. There is that increase in personal stature that should result from education. Subject [matter], however interpreted (industrial arts subject matter), is but a means to an end.

Microfilm copy of complete manuscript of pages, $2.88. Enlargements 6" x 8", 10¢ per [page]. Library of Congress card number Mic A53-[illegible]

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Matthews, Jr., Paul, Jones
(Last name) (First name) (Middle name)

Exact Title DEVELOPING OCCUPATIONAL DEMAND AND PERFORMANCE CURRICULA IN MATHEMATICS FOR VOCATIONAL-TECHNICAL EDUCATION AT THE TULSA AREA VOCATIONAL-TECHNICAL EDUCATIONAL CENTER

Degree granted ED.D., Date 1972 No. of pages in report 199

Granted by The University of Tulsa Tulsa, Oklahoma
(Name of institution) (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to provide schools and administrators with a model for the identification and correction of mathematics deficiencies through the use of a concept diagnostic and individually prescribed concept correction package approach. It was presumed that occupations could be analyzed so that mathematical competencies needed for successful performance could be determined, that mathematical concepts needed in occupations could be identified and individual deficiencies could be isolated for each student, that needed mathematics concept correction packages could be organized or constructed, and that it could be demonstrated that the students, who have deficiencies in needed mathematics concepts, have reached set performance standards after completion of concept correction packages.

Two hundred thirty-five students in five occupational areas at the Tulsa Area Vocational-Technical Center were screened by administering concept group diagnostic tests in whole numbers, fractions and mixed numbers, and decimals. The 47 students who failed to meet a predetermined standard on any of the three tests were selected to participate in the study. The standards were established by surveying a population consisting of occupational area instructors and practitioners.

The 47 students were tested in the first 17 of a total of 37 identifiable basic mathematics concepts, that had been listed by the investigator, instructors and practitioners, using tests constructed by the investigator to see if the students met a predetermined standard. If a student did not meet the predetermined standard of 80% he was considered to be deficient in that concept. Standards were established by the aforementioned surveys. The 47 students exhibited 460 deficiencies in the 17 concepts. Concept correction packages were assembled or constructed and administered, using various electronic equipment, in a media center operated by the investigator. Each student was posttested after the administering of each concept correction package to see if he had met the standard. If the students failed to meet the standard, he was recycled through the package. Students were administered individually prescribed concept correction packages for only the concepts in which tests indicated a deficiency. The material used in the concept correction was composed mainly of cassette tape with printed material, video tape, printed drill materials, cassette tape and filmstrip, and record and filmstrip.

At the end of a 59 school day period 308 of the 460 concept deficiencies had been corrected. The average concept correction time was 59.1 minutes. Twenty-four of the 47 students were able to correct all measured deficiencies in the 17 concepts used in the study.

The following conclusions were drawn from the results of this study:

1. It is possible to analyze occupations so that needed mathematics competencies for successful performance can be determined.
2. Mathematics concepts needed in occupations can be identified and individual deficiencies isolated for each student.
3. Individual concept correction packages can be organized or constructed.
4. It can be demonstrated that students, who have deficiencies in needed mathematics concepts, have reached set performance standards after completion of concept correction packages.
5. The diagnostic and individual prescriptive correction package approach was enthusiastically received by students and reduced boredom.
6. The multimedia approach, although time consuming for the teacher, is feasible.
7. There is no one best type of instructional material, yet the multiple approach offers something for all students.

The following recommendations were made as a result of this study:

1. That a similar study in basic mathematics be made over a longer period of time using a similar diagnostic and prescriptive correction approach at the elementary level.
2. That a study be made to determine the feasibility of using a diagnostic and prescriptive correction approach in other subject areas.

Order No. 72-21,816, 199 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Martin (Last name), Waldo (First name), Dean (Middle name)

Exact Title THE IDENTIFICATION OF OCCUPATIONAL AREAS FOR EMPHASIS IN VOCATIONAL EDUCATION PROGRAM PLANNING

Degree granted Ed.D., Date 1970 No. of pages in report 149

Granted by University of Illinois, (Name of institution) Urbana-Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

In the past the planning of programs in vocational education was conducted at the local level. As the research literature indicates, many variables are relevant to educational planning at the local level. Some of these variables are manpower demands, student needs, teacher availability, existing educational offerings, financial base, local union and management activities and policies, and available space and equipment. Formerly, local manpower demands and certain other variables were considered, but little, if any, consideration was given to the needs and interests of students.

One of the purposes of this study was to develop a technique for determining which occupational areas should be considered when planning educational programs for high school age youth. A second purpose was to apply the technique and identify the occupational areas that should be considered for emphasis when planning educational programs across a sample of eighteen communities. Primary emphasis was placed on manpower demands and student needs because of their extreme importance in occupational program planning.

The eighteen communities included in this study represented a variety of geographic and demographic characteristics and were located throughout the United States.

To obtain interpretations of manpower demands and student needs, essentially all sub-professional occupations were grouped into thirty-nine occupational categories. A card sort technique was used, and community leaders and school district staff members in each community were asked to rate each occupational category on a five-point scale according to the manpower demands in the community. School district staff members were asked to rate the occupational categories a second time based on the need of high school age youth in the community.

The intrarater reliability of the instrument was 0.78 for the manpower demands card sort and 0.72 for the student needs card sort. The interrater reliability averaged 0.87 for interpretation of manpower demands and 0.89 for interpretations of student needs across the eighteen communities.

Statistical analysis of the data indicated that six of the occupational categories were rated high based on manpower demands and student needs. They included Clerical and Secretarial, Data Processing and Information Retrieval Systems, Automotive Repair and Internal Combustion Engine Maintenance and Repair, Bookkeeping and Business Machines, and Patient Care. Other categories were rated high based on manpower demands but lower on student needs. They included Administration and Planning-Health, Patient Care, and Building Construction and Maintenance. Three occupational categories were rated high based on student needs but lower on manpower demands. They were Drafting Occupations; Graphic Arts and Commercial Photography; and Aircraft Maintenance, Operations, and Ground Support.

It would be desirable to conduct additional studies to check the validity and supplement the findings of this study. The results were significant, however, and the sample of communities did represent a variety of geographic and demographic characteristics.

Order No. 71-14,859, 149 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Martinez, Jr. (Last name), Pete (First name), ____ (Middle name)

Exact Title AN EXPERIMENTAL ANALYSIS OF PERCEPTUAL DIRECTION AS A FACTOR IN LEARNING A PSYCHOMOTOR TASK

Degree granted Ph.D., Date 1970 No. of pages in report 134

Granted by University of Maryland, (Name of institution) College Park, Maryland (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study compared the effects of subjective and observer directions of viewing a lecture-demonstration to identify the direction which was most effective in teaching a psychomotor task via a video-taped presentation.

Three treatment groups were used in the experiment, which included: (1) Treatment One, which received the presentation from a subjective viewpoint; (2) Treatment Two, which received the presentation from an observer point of view; and (3) the Control Group, which received no instruction.

The space relations section of the Differential Aptitude Tests and selected sections of the MacQuarrie Test for Mechanical Ability were administered to the experimental population. The raw scores on these instruments were used to assign the subjects to high and low sections. Two-two x two analysis of variance matrices utilizing treatment versus spatial ability and treatment versus manipulative ability were used to test the hypotheses. All the hypotheses were tested at the .05 level of significance.

Results

The matrix which included the factors of treatment and manipulative ability yielded insignificant F ratios on both levels and interaction. The matrix using treatment and spatial ability as factors indicated the high spatial ability group scored significantly higher than did the low spatial ability group. The treatment levels and interaction yielded insignificant F ratios.

Conclusions

The following conclusions were based upon the experimental findings used to test the hypotheses:

Hypothesis 1. There was no significant difference in the performance of the psychomotor task between the two treatment groups.

Both analyses of variance matrices yielded an insignificant F ratio. It was concluded that hypothesis 1 was supported by the data.

Hypothesis 2. There was no significant difference in the performance of the psychomotor task by the high spatial relations group and the low spatial relations group.

The analysis of variance produced a significant F ratio; thus, it was concluded that hypothesis 2 was not supported by the data.

Hypothesis 3. There was no interaction between spatial ability levels and treatments in the performance of the psychomotor task.

The analysis of variance produced an insignificant F ratio. It was concluded that hypothesis 3 was supported by the data.

Hypothesis 4. There was no significant difference in the performance of the psychomotor task by the high manipulative skills group and the low manipulative skills group.

The analysis of variance produced an insignificant F ratio. It was concluded that hypothesis 4 was supported by the data.

Hypothesis 5. There was no interaction between manipulative ability levels and treatments in the performance of the psychomotor task.

The analysis of variance yielded an insignificant F ratio; thus, it was concluded that hypothesis 5 was supported by the data.

Implications for Education

The findings of this study indicated that the students' perceptual direction in viewing a demonstration produced no significant differences in measurable learning on the psychomotor task. It was noted that each treatment group performed more accurately on items that were more directly related to their perceptual angle. Thus, the perceptual direction used to produce mediated instruction was not as important, as long as visual clearance and visual clarity were maintained. Furthermore, the findings indicated that spatial ability affected the learning to a greater degree than did manipulative ability.

Order No. 71-16,291, 134 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Maw (Last name), James (First name), Lee (Middle name)

Exact Title A MEASUREMENT STUDY OF ATTITUDINAL INTERACTIONS OF SELECTED VOCATIONAL SCHOOL TEACHERS AND STUDENTS CONCERNING ATTENDANCE AND GRADES WITH IMPLICATIONS FOR ADMINISTRATOR TRAINING

Degree granted Ed.D., Date 1971 No. of pages in report 187

Granted by The University of New Mexico (Name of institution) Alburquerque, New Mexico (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was designed to measure attitudinal interactions of selected vocational school teachers and students concerning grades and attendance, school policy problems, at a Technical Vocational Institute. This was done in an attempt to determine whether students and teachers viewed themselves and existing attendance and grading policy as constants or variables. It was assumed that those receiving scores indicating they considered themselves constants would be more likely to support the existing policy while those receiving scores indicating they considered themselves variables would be more likely to desire a policy change.

Teachers and student attitudinal interactions were measured and plotted on a graph to represent a synthesis of teacher and student attitudes as measured by the Kerlinger-Kaya Progressive Traditional Educational Scale. The graph and the Kerlinger-Kaya Educational Scale are integral parts of the Educational Attitudinal Synthetic Plane Placement Instrument, developed by Felix Garcia Jr. and John P. Grillo, which was used for this study.

Seventy students and fifteen teachers participated in the study, and all student testing was done in the classrooms of the Technical Vocational Institute within one week. The students represented two disciplines, Data Processing and Machine Trades. Data was handled through a computer program developed by John P. Grillo, a co-developer of the EASPP. This program synthesizes student and teacher attitudinal interaction scores into one graph plot for interpretative purposes.

It was found that the majority of teachers and students held progressive subscale scores as measured by the Kerlinger-Kaya Educational Scale. Moreover, when students selected teachers and teachers selected students to match established problems on the opinionnaire, the combination of scores was predominately progressive. These reactions seemed to indicate the majority of respondents have indicated their propensity to change the Technical Vocational Institute policy for grades and attendance with grades being considered more a variable than attendance was considered a variable.

The Data Processing II and V groups were found to be the most reactionary and variable, and Machine Trades III was the least variable. When students chose teachers to match the established problems, it was found that teachers contributed more progressive attitudinal intensity for changing grades than was exhibited by the selecting students.

This instrument could be used to identify potential partners in the change process if administrators are interested in including staff or students in policy change. School personnel, collegiate educators and State Departments of Education leaders could employ this instrument with different problems to measure attitudinal interactions related to policy change.

Order No. 72-13,794, 187 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Medeiros (Last name), Edward (First name), Joseph (Middle name)

Exact Title IMPLICATIONS OF NUMERICAL CONTROL MACHINES FOR VOCATIONAL EDUCATION

Degree granted Ph.D., Date 1970 No. of pages in report 413

Granted by The University of Michigan, (Name of institution) Ann Arbor, Michigan (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The study explored the possibility of need for strengthening the State of Rhode Island's program of vocational education to include specific courses designed to train workers for operation and maintenance of numerically controlled machines. The study included an assessment of current and projected use of numerical control machines in the Rhode Island metalworking industry and a comparison of the skills and knowledges needed by operators and maintenance workers on conventional machines with competencies needed by operators and maintenance men on numerical control machines.

The research design, developed after intensive study of related literature, includes an analysis of: (1) anticipated increased use of numerical control machines in Rhode Island metalworking industry, (2) educational backgrounds of workers in four selected numerical control occupations (drill press operators, milling machine operators, multi-machine operators and maintenance workers), (3) the skills and knowledges needed by workers in these occupations, (4) a comparison of skills and knowledges of conventional workers with those of numerical control workers in the same occupational categories, (5) possible implications for general education as well as specialized education as a result of the introduction of numerical control machines, (6) the need for change in present machine shop course content.

Information on number and kinds of numerical control machines presently being used and number and kind projected for use by 1970 was included in an employer interview questionnaire.

An opinion questionnaire, after having been refined in cooperation with three out-of-state companies, determined projected changes in metalworking occupations and the implication of these changes for vocational-industrial education programs in Rhode Island.

An in-plant job analysis was made of machine operators and maintenance men in both conventional and numerical control manufacturing processes. Interviews were held with the individual machine operators and maintenance men to obtain a detailed outline of their job operations and related technical information necessary for the performance of these duties. In addition, interviews were held with shop foreman and training directors to obtain an on-the-job analysis of the occupational categories included in this study.

The in-plant analyses revealed that the only difference between conventional drill press operators and numerical control drill press operators is in their ability to read and follow process sheets. Both types of operators need high mechanical aptitude and average intelligence.

Based on facts, one concludes that conventional milling machine operators and numerical machine operators should have a sound knowledge of the fundamentals of machine tool operations including the use of jigs and fixtures and machine set-up techniques. The related knowledge requirements are the same for both types of operators; and both operators must be capable of operating a multipurpose machine. Conventional milling machine operators possess greater ability in maintaining accurate production standards, while numerical control milling machine operators must be familiar with punched tape procedures and other magnetic control devices.

On the basis of the findings as revealed in the research data, the following conclusions are made:

1. The use of numerical control machines will increase in the 50 to 100 per cent range by 1970.
2. The number of employees related to numerical control applications of machine tools will increase approximately 120 per cent by 1970.
3. Numerical control applications on machine tools cause a shift of emphasis from manual skills to mental skills.
4. Conventional machine operators and maintenance men should be retrained to include numerical control machine operations and maintenance.
5. Vocational and technical schools should include basic courses for numerical control machine operators and machine maintenance men.

Order No. 71-15,238, 413 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Meers (Last name), Gary (First name), D. (Middle name)

Exact Title EFFECTS OF VARIOUS FEEDBACK MEDIA ON PSYCHOMOTOR ACHIEVEMENT

Degree granted Ed.D., Date 1972 No. of pages in report 77

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

The study attempted to answer the following question: What difference in psychomotor achievement would occur among students receiving differing kinds of feedback?

Source of data and method of study:

This investigation was conducted as an experimental comparison of three methods of feedback upon psychomotor achievement. The population from which the subjects were drawn consisted of 100 seventh grade students enrolled in industrial arts at Oakland Junior High School- Columbia, Missouri. Manual dexterity was measured by administering the United States Employement Service Pegboard Apparatus Test of Manual Dexterity. After compiling the data, the subjects were randomly assigned to the treatment groups.

Findings and Conclusions:

1. That students receiving qualified directive feedback of their performace will perform at a higher level of psychomotor achievement.
2. That students receiveing feedback in these forms, will perform at a lower level of psychomotor achievement that subjects receiving feedback in the form of a panel rating.
3. Since the findings of this study indicated that students who received videotape-panel rated feedback performed at a significantly higher level of psychomotor achievement as compared to the two other forms of feedback, qualified directive information concerning their performance will result in higher psychomotor achievment levels.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Mellinger (Last name), Barry Lee (First name), _____ (Middle name)

Exact Title AREAS OF CONCERN IN TECHNICAL INSTITUTE ACCREDITATION

Degree granted Ph.D., Date 1972 No. of pages in report 247

Granted by Purdue University (Name of institution) Lafayette, Indiana (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to identify areas of concern in technical institute accreditation. Specifically, the study sought to determine the extent to which areas of concern: (1) stemmed from difficulties experienced by technical institutes in complying with accreditation requirements which they considered appropriate or from requirements which they did *not* consider appropriate; (2) were related to the extent of experience of technical institute officials with the accreditation process; and (3) were related to selected accreditation and institutional variables. An attempt was also made to identify the relative degree of helpfulness of certain sources of assistance to technical institutes in achieving or maintaining regional accreditation.

The population included all (101) two-year degree-granting technical institutes in the regions served by two regional accrediting agencies. For the population of technical institutes, data from two primary sources were obtained: (1) 1631 specific comments in 69 accreditation evaluation team reports (41 regional and 28 specialized); and (2) responses (93.1% return) of technical institute officials to a mailed survey instrument which elicited reactions to selected aspects of the accreditation process.

The analysis of data was based on the relative frequencies of team comments and survey responses. Utilizing composite frequencies of team comments and survey responses, major areas of concern in technical institute accreditation were identified. Statistical comparisons between the responses of selected groups of technical institute officials and between selected distributions of team comments were made using the Chi Square (X^2) "Test of Independence" at the five percent level of significance.

Within the limitations of this study, major findings were:

1. Areas of concern in technical institute accreditation were found to exist. These concerns, to some extent, stemmed both from divergent philosophical points of view and from difficulties encountered by technical institutes in complying with accreditation requirements which they considered to be appropriate;
2. technical institute officials almost unanimously held a favorable attitude toward regional accreditation and considered it an effective process for improvement of technical institutes, though they also disagreed with certain accreditation requirements, policies, procedures and practices;
3. the extent of actual experience with accreditation did not appear to be a major distinguishing factor in the identification of problem areas by technical institute officials;
4. areas of concern varied to a limited extent depending upon such factors as type of accrediting agency, enrollment, scope of educational program, age of institution, types of accreditation held, and population of area served;
5. certain techniques were particularly helpful to technical institutes in preparing for accreditation and in most instances, these were services of accrediting agencies or required accreditation procedures;
6. the areas of greatest concern, based on relative frequencies of comments in accreditation team reports, generally resulted from the failure of technical institutes to develop and follow formal institutional policies and procedures, rather than from such quantitative shortcomings as inadequate library holdings and physical facilities, though such matters were also problem areas;
7. technical institute officials generally felt that regional accrediting agencies did not fully understand the technical institute; the officials felt this lack of understanding accounted for some inappropriate evaluative criteria, procedures, and practices;
8. many areas of concern appeared to stem from problems of terminology, and from a general lack of effective communication, rather than from substantive differences of opinion; and
9. the need for greater coordination of regional and specialized accreditation procedures was indicated by technical institute officials who also felt that regional accrediting agencies should give greater attention to the evaluation of specific curricula offered by technical institutes.

Order No. 72-21,238, 247 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Miller, Jr., Frank, Milton
(Last name) (First name) (Middle name)

Exact Title EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS

Degree granted Ed.D., Date 1971 No. of pages in report 101

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: This study was conducted in an effort to ascertain the relative effectiveness of selected approaches to the teaching of technical related information. The study sought to test the theory that students who study in small groups will learn more technical related information than students who study individually. Therefore, the purpose of this study was to compare experimentally the relative effectiveness of three classroom organizational schemes whereby students were exposed to technical related information in industrial arts. The three organizational schemes were: (A) individual achievement in a small group setting with no teacher interaction in the small group, (B) group achievement in a small group setting with no teacher interaction in the small group, and (C) individual achievement in an entire class with no teacher interaction with the class.

METHOD OF RESEARCH: Three informational topics were developed and recorded on super 8mm color film with separate but synchronized audio tapes.

The population for the study consisted of 48 ninth grade boys enrolled in three industrial arts classes at Jefferson Junior High School, Columbia, Missouri during the second semester of the 1970-71 school year. In two of the treatments each class was randomly divided into four small groups while in the third the class remains intact.

The counterbalanced design was employed which exposed all students to all treatments. Each day of the experiment was a repeat of the previous day, with the order of classes and the order of the informational topics changing, until each class had experienced each treatment.

An appropriate statement of behavioral objectives was provided to each student corresponding to each treatment and to each informational topic. The students then viewed a filmed presentation with synchronized sound over a selected informational topic. After the film presentation the class was assigned to one of three treatments. A post-test was given to each student at the conclusion of the treatment period. After the students had experienced all three treatments they were asked to complete an opinionaire to ascertain their reaction toward the instructional approaches.

CONCLUSIONS: Because the analysis of the scores from the cognitive tests failed to reveal any significant differences, it may be concluded that the cognitive understanding attained by students will be essentially the same when either of the three instructional approaches are used.

Due to the relatively high per cent of students responding in favor of the small groups it appears that students who work in small groups can be expected to: (1) increase their level of enjoyment, (2) consider learning to be easier, (3) experience a reduction in frustration, and (4) find learning more challenging, than when individual study is used.

Due to the relatively high per cent of items answered correctly on the cognitive test of achievement by all students, it appears that the instructional approaches used in this study can be considered to be effective means of presenting related information.

Order No. 72-10,559, 101 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Miller (Last name), John (First name), R. (Middle name)

Exact Title A CONTENT ANALYSIS OF BUSINESS AND INDUSTRIAL COMMUNICATION TRAINING FILMS

Degree granted Ed.D., Date 1970 No. of pages in report 146

Granted by University of Southern Mississippi, (Name of institution) Hattiesburg, Mississippi (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem: The problem was to study and determine by content analysis what are communication training films? What are their implicit objectives? What is their potential effectiveness in terms of their purposes? Do today's communication training films provide the modern employee with adequate communication understanding and skills? The basic objectives of the study were:

(1) To locate and classify business and industrial communication training films.
(2) To systematically apply these films to quantitative and qualitative methods of content analysis to determine their content substance.
(3) To determine whether the films meet their stated objective.
(4) To ascertain the target of the communication content.
(5) To categorize the intensity of the instructional content.
(6) To ascertain the broad category of each training film.
(7) To determine the basic organizational form of the films.
(8) To determine the basic theory or approach of the films.
(9) To classify the appeals, arguments, and the proofs used or employed in the films.
(10) To identify the mode employed in the films.
(11) To categorize the introduction of the films with regard to attention getting devices.
(12) To determine whether credibility is established by the source of the message.
(13) To evaluate the various film production techniques, such as: selection of content, development of content, photography, sound, lighting, acting, direction, plot, theme, and musical effects.
(14) To establish the educational training value of the films.

Summary and Conclusions: Statistically speaking, the typical business and industrial communication training film is thirteen minutes and thirty-seven seconds in length. It would be classified as a perceptual-motor skill training film, under internal organizational communication. Its stated purpose would be achieved 82% of the time. Its assumed purpose would be stated clearly, but it will not always be achieved. In selecting content the film will be successful about 73% of the time. The typical training film will be developed successfully 77% of the time. The idea will normally be developed clearly, but the story will not always continue smoothly.

The film will generally attract attention and sustain interest; however, due to poor camera angles and distance shots, it will not always accurately explain the non-verbal substance. Good photographic quality is achieved in the film about 65% of the time. If there is one bad aspect of the business and industrial communication training, it is the poor photographic quality. The scenes are poorly laid out and the close-ups, lighting, and scene footage is technically below average. Sound is the second major problem of the business and industrial communication training film. The reproductions are not always clear and the speech is sometimes too fast for appropriate communication. With regard to educational training value, there is room for improvement. Most of the films are produced for large audiences, instead of being tailored to specific audiences. It is very difficult to include specific educational objectives in a film that is intended for a shotgun type of audience.

The average cost of a single training film is anywhere between $575 to $1,360 per minute. The typical training film, which is 13.37 minutes long, would cost from a low of $7,687 to a high of $18,183 per film. This cost is very hard to justify for some members of the management team; therefore, they produce films that hopefully will adapt to several kinds of audiences.

The overall technical rating on a percentage basis for the typical communication training film was 72%. The average communication training film is targeted to lower and middle management. The typical film is presented in the persuasive manner, as opposed to the basic informative technique. Order of definition is the typical form of organization. The basic theory in the films was the process approach. The average film employed the case study or single mode of presentation.

What are the major faults of the typical business and industrial communication training films? For one thing, the films are too old. Almost all are black and white, only a few are in full color. The majority of the films are outmoded technically speaking. They are too short in length, and they are cheaply produced; therefore, this researcher will conclude that they will not do the job of training members of the business and industrial community as well as a film that is produced today for the same purpose. Practically all the communication training films in use today need some kind of revision, in one way or another.

Order No. 71-13,579, 146 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Miller (Last name), Larry (First name), Reed (Middle name)

Exact Title THE COMPARISON OF THE COGNITIVE ACHIEVEMENT AND AFFECTIVE BEHAVIOR OF STUDENTS ENROLLED IN THE INDUSTRIAL ARTS CURRICULUM PROJECT PROGRAM WITH STUDENTS ENROLLED IN CONVENTIONAL INDUSTRIAL ARTS PROGRAMS

Degree granted Ph.D., Date 1971 No. of pages in report 231

Granted by The Ohio State University (Name of institution) Columbus, Ohio (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )
Available for consultation at Ohio State University Library

In the period from 1965 to 1971, a group of men headquartered at The Ohio State University provided the leadership for developing and testing a two year innovative industrial arts curriculum sequence for the junior high school. This effort, entitled the Industrial Arts Curriculum Project (IACP), was funded by the United States Office of Education with a total expenditure that exceeded 2 million dollars. One of the principal undertakings of the IACP was a comprehensive evaluation system that monitored the progress of the project and provided viable alternatives for decision making. During the last year of the projects' existence, the 1970-71 academic year, evaluation was focused toward the collection of evidence that attested the worth of the instructional system that was developed. This study was one part of that total effort.

The major problem of this investigation was to compare cognitive achievement and affective behavior of: (1) students enrolled in the two year program developed by the IACP in field evaluation centers, (2) students enrolled in the IACP program in field demonstration centers, and (3) students enrolled in conventional junior high school industrial arts programs in which the IACP instructional system was not utilized.

For this evaluation study, a post test-only design was used with intact classroom groups in five field evaluation and five demonstration centers of the IACP and a comparable group of students taking conventional industrial arts courses. A total of 3128 students participated in the study. Four test instruments were used as criterion measures: the IACP construction and manufacturing comprehensive achievement tests, a conventional general industrial arts test developed by the Educational Testing Service, and an attitude scale developed for this study. After the test returns were received by the investigator, samples were drawn which provided the data used to investigate the major questions of the study. The students' test scores were analyzed and adjusted statistically by using analysis of covariance in order to control for any initial variations existing in known factors related to the variables under study.

The analysis of data collected in the study revealed that students enrolled in "The World of Construction" course in the field evaluation and demonstration centers performed at a significantly higher level than did students enrolled in conventional industrial arts on The World of Construction Achievement Test-Comprehensive Exam. Furthermore, students enrolled in "The World of Manufacturing" course had a higher level of cognitive achievement than did students enrolled in "The World of Construction" course and the conventional industrial arts programs on The World of Manufacturing Achievement Test-Comprehensive Exam.

In investigating the students on cognitive knowledge of conventional industrial arts as measured by the Cooperative General Industrial Arts Test, the data analysis revealed that the students enrolled in the IACP program performed at the same level as did students enrolled in conventional industrial arts courses.

The analysis of data of the sample of students that completed the General Scale of Attitudes of Junior High School Industrial Arts revealed that the groups were not statistically different in the overall level of attitudes as measured by the attitude scale.

The central conclusion drawn from the analysis of data in the study was that students after completing the IACP instructional system achieved as well as conventional industrial arts students concerning conventional industrial arts subject matter and significantly higher than conventional industrial arts students on the tests of cognitive knowledge of the managed-production system of which the IACP courses of Construction and Manufacturing were designed. However, student attitudes for the constructs measured were not significantly different between the groups investigated.

Order No. 72-4576, 231 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Mills (Last name), Earl (First name), Sidney (Middle name)

Exact Title AN EVALUATION OF STRATEGIES APPLIED IN AN EXPERIENCED TEACHER FELLOWSHIP PROGRAM FOR INDUSTRIAL EDUCATION TEACHERS

Degree granted Ed.D., Date 1971 No. of pages in report 252

Granted by Wayne State University (Name of institution) Detroit, Michigan (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to evaluate the three ExTF Programs conducted by the Department of Industrial Education at WSU during the 1967-68, 1968-69, and 1969-70 academic years. The study focused on those strategies developed specifically for the ExTFP to determine their effectiveness, efficiency, and relevancy in the professional development of teachers to assume leadership roles in the field of industrial education. The following strategies were evaluated: 1) en bloc treatment, 2) orientation meetings, 3) special fellowship room, 4) departmental involvement, 5) studies in sociological and psychological conditions influencing education in inner-city schools, 6) curriculum design utilizing instructional technology 7) industrial schools, 8) field trips, 9) testing of curriculum materials, 10) conferences with national leaders in industrial education, 11) a study of innovative programs in industrial education, and 12) outside activities involving all of the Fellows. More specifically, the study was an effort to pin-point those activities used in each strategy which have proven to be beneficial in training teachers and which may show promise for traditional teacher training programs in industrial education.

Methodology for the Study

A preliminary study was conducted 1) to determine which criteria the Fellows believed would best describe the effectiveness of the ExTF Programs, and 2) to select the methodology most appropriate for gathering the information. The preliminary study was conducted through small group conferences and individuals from each program.

Based on the findings of the preliminary study, it was suggested that the information be gathered in the following areas: 1) changes in professional activities, 2) rating of the overall objectives of the program, 3) evaluation of twelve strategies, and 4) general reactions and recommendations to the total program. Two methods were selected to gather the information: 1) an instrument mailed to each Fellow who participated in the programs, and 2) small group conferences with one-third of the Fellows from each program. The information from both the mail instrument and the small group conferences was tabulated and recorded in a comprehensive report.

Conclusions of the Study

Based on the results of the study the following conclusions were made:

1. The professional activities of the Fellows significantly increased after their participation in the ExTFP, particularly in the areas of publishing and their involvement in national educational associations.

2. As a result of the ExTFP a significant number of Fellows raised their educational and vocational goals, with a large number going on for a doctorate and many indicating the desire to move into an administrative position.

3. All the objectives were appropriate for graduate programs in industrial education, and there were provisions in each of the three programs so that the Fellows could achieve each of the objectives.

4. All twelve strategies were rated by the Fellows as being successful in achieving the objective of the program.

5. The most successful and vital strategies to the success of the program were: a) conferences with national leaders, b) fellowship room, c) en bloc treatment, d) work in instructional technology.

The Author's Observations

In conducting this research several observations were made in regard to the ExTFP. Although these are not conclusively supported by the findings, there was sufficient support, however, to warrant their inclusion as observations in this section. 1. The Fellows gained confidence in their ability to communicate while in the program. 2. Stronger friendship and esprit de corps were developed because the wives of the Fellows in the first program assisted in giving leadership to social activities. 3. The ExTFP called for a total commitment for the whole family; anything less resulted in family problems and problems between the Fellows. 4. Those who came to Detroit with their families had the most positive experience. 5. The ability of the staff to make changes during the program to meet the needs of the Fellows was a major factor in the success of the program. 6. The flexibility of the staff enabled the program to meet individual needs. 7. The general reaction of the Fellows to the total program was very positive. 8. There were two major shifts between the three programs: a. There was a shift in the curriculum of the Fellowship program itself from a technical emphasis in the first year, through a transitionary period the second year, into an emphasis on curriculum development in the third year. b. There was a shift in the population of the Fellows from rural and suburban areas with emphasis on academic standing, to the urban areas with emphasis on two or more teachers coming from the same [illegible] was reflected in the selection [illegible] program.

Order No. 72-14,[illegible], 252 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Milnor (Last name), Brent (First name), Thomas (Middle name)

Exact Title A STUDY OF THE VOCATIONAL MALE STUDENTS OF ONE AREA VOCATIONAL CENTER

Degree granted Ed.D., Date 1971 No. of pages in report 162

Granted by Illinois State University (Name of institution) Normal, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The major problem of this study was to evaluate the educational effectiveness of one Illinois high school level vocational area center. On the basis of certain criteria this study attempted to determine if this vocational center did indeed meet the needs of students going into the work force upon graduation from high school better than the non-college preparatory program in high schools in the area.

To determine the effectiveness of the Decatur Area Vocational Center these two major hypotheses were tested:

I. Vocational programs are effective in giving students saleable skills as shown by: (1) students entered occupations for which they were trained, (2) students were in these occupations two years after graduation.

II. There are employment differences between nonvocational and vocational students as shown by: (1) days to find employment, (2) number of students employed in local community, (3) number of types of jobs, (4) number of employers, (5) wages paid in initial job, (6) wages paid two years later, (7) attendance record during four years of high school.

To determine whether employment outcomes could be attributed to the programs or student variables, these three hypotheses were tested:

I. There are academic differences between nonvocational and vocational male students.

II. There are environmental differences between vocational and nonvocational male students.

III. There are socio-economic differences between nonvocational and vocational male students.

The following statistical tests were used at the .05 level of significance, a two way analysis of variance, t-tests of two independent means, and chi-square tests.

The study showed that area vocational center graduates find employment in the occupation for which they are trained. Compared to nonvocational students, they use fewer days to secure their initial employment; they earn more money per hour in their first job and their pay per hour two years later is more than the nonvocational group.

Order No. 72-9860, 162 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author MONTELEONE (Last name), THOMAS (First name), I. (Middle name)

Exact Title IMPLEMENTATIONS FOR A COURSE IN ADVANCED ELECTRICITY IN INDUSTRIAL TEACHER EDUCATION

Degree granted Ed.D., Date 1952 No. of pages in report 192

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to design and c
str[illegible] electrical apparatus which will implemen[illegible]e
teaching of electricity in the j[illegible] and senior high
school industrial arts shop as [illegible]es in the teacher
training institution. The ap[illegible] which have been
developed in this study are tho[illegible]hich are usually
omitted from the school shop b[illegible]se of their cost
because the commercially buil[illegible]s are unsuitable
for the teaching situation found [illegible]e school shop.

The units described are: T[illegible]ical Power Unit,
Electroplating and Anodizing [illegible] Unit, Vacuum
Tube Characteristics Demonst[illegible] Panel, Regulated
Voltage Power Supply, and Indu[illegible]s Meter. The e[illegible]-
planation of electroplating and a[illegible]izing are included
the appendix.

In the process of their develo[illegible]ment, many differe[illegible]
circuits were tried. Some pro[illegible] be too costly t[illegible]
be practicable; others provid[illegible] too complex [illegible]
constructed by the student; and [illegible] did not satisfy
fulfill the need. Many months o[illegible]xperimentation [illegible]
actual shop use have produced [illegible] which give sa[illegible]-
sfactory performance. The author [illegible]considered many
factors, such as: safety, quality, simplicity of de-
sign, simplicity of construction, [illegible] compactness as
to shop space required. To eli[illegible]e construction d[illegible]-
ficulties color coded wire has [illegible]used throughout.
The construction procedure ind[illegible]s the color of the
wire to be used. These units [illegible]esently in daily
operation in the Industrial Arts [illegible]rtment of
Teachers College of Connecticut[illegible] Buffalo.

Educational utilization and [illegible]structions are found
in the early part of the study, fol[illegible]ed by the construc-
tional data on each apparatus.

More than usual emphasis is [illegible]ced on the con-
struction details and on the spec[illegible]fications of the mate-
rials which are used. The proce[illegible]e is illustrated by
actual photographs and drawings [illegible]factor that will
prove helpful to the teacher and [illegible]e student builder.

The author points out that ma[illegible]units have been
constructed in the electricity cl[illegible]s by prospective
teachers at Teachers College of [illegible]
the schools where they will be [illegible]ed or to
meet their hobby activities at h[illegible]. The hope
been expressed that the experien[illegible]ce in the con-
struction of these units will lead [illegible]to development
of other electrical shop apparatu[illegible]s which
that in this manner the teaching [illegible]
ples will be made dramatic, vivi[illegible]
for students to understand.

Microfilm copy of complete m[illegible]script of 192
pages, $2.70. Enlargements 6" x [illegible]
Library of Congress card number [illegible]

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Morehead (Last name), James (First name), Caddall (Middle name)

Exact Title THE MECHANICS OF A THIN FILM OF LITHOGRAPHIC INK BETWEEN A PAIR OF ROTATING ROLLERS

Degree granted Ph.D., Date 1971 No. of pages in report 228

Granted by Carnegie-Mellon University (Name of institution) Pittsburg, Pennsylvania (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This thesis is a fundamental study to determine the mechanical behavior of printing ink when it is deformed and split between the surfaces of two parallel rotating rollers. This work is done since an understanding of the printing press ink system is necessary for best utilization of the printing process.

In this work the development and solution of certain analytical models for the fluid flow between the rollers is presented. The Newtonian and power law fluid models are used in this development. For the purposes of this thesis, the conventional inkometer is shown to be inadequate for meaningful measurements of useful ink properties, and modifications are made and discussed. A series of experimental studies performed on the modified inkometer is included that consists of measurements of the moment generated by the ink, measurements of the ink film thickness, and geometrical measurements for the entrance region. A comparison of experimental and analytical results is made. Some modifications to the measured rheological properties of the inks were necessary in order to give results that compare well with the experimental values. Semi-empirical corrections are made for the film-splitting region.

The full-film region of ink contact between the rollers is shown to account for one-half to two-thirds of the total moment generated by the ink in many cases. The remainder of the moment is produced by the film splitting region. Viscometric properties of inks as measured by conventional techniques are found to be inadequate for modeling the mechanics of printing inks in a nip. Order No. 72-4251, 228 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Morrill (Last name), David (First name), _____ (Middle name)

Exact Title A STUDY TO DETERMINE THE EFFECTIVENESS OF SELECTED GRAPHIC ARTS FILMSTRIPS FOR TEACHING LITHOGRAPHY UNITS WITH IMPLICATIONS TO DEVELOPE ADDITIONAL UNITS

Degree granted Ed.D., Date 1970 No. of pages in report 132

Granted by Texas A&M University, (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The primary objective of this study was to evaluate the effectiveness of selected single concept filmstrips as instructional supplements for photo-offset lithography units in graphic arts curriculums. A secondary purpose was to identify other photo-offset lithography units necessitating similar educational filmstrip development. A survey and an experimental approach were the two research methods employed to ascertain the required information.

The experimental study was conducted in two junior colleges and two senior colleges in Texas with similar programs of graphic arts. Each cooperating institution provided at least two classes for a control and an experimental group. Two units and methods of instruction were applied to the 146 students completing the experiment.

The experiment was devised to examine the initial learning and overall retention of students receiving the halftone and color presentations. A multiple-choice achievement instrument for each unit served as a pretest, posttest, and test of retention. Student mean gain as measured by the achievement test was the criterion used to determine the effectiveness of the filmstrips.

An analysis of variance technique provided the statistical inferences derived from the experimental research. Test scores that resulted from initial learning and retention were analyzed. Comparison of the overall mean gains indicated that the experimental method for both units was higher on every reported score except the initial learning results on the color unit.

Experimental results obtained from differences in raw scores on the achievement tests warrant the following conclusions:

1. Lack of significance on the overall F-test for method effects led to the acceptance of hypothesis one: There is no significant difference in the initial learning of the experimental group versus the control group for the selected photo-offset lithography units in graphic arts curriculums.
2. The overall F-test for method effects failed to indicate any significant difference for retention which led to the acceptance of hypothesis two: There is no significant difference in the overall retention among students receiving the filmstrip method of instruction and those receiving the conventional method.

Two hundred and sixty survey instruments, consisting of a questionnaire and evaluation sheets, were received from graphic arts teachers previously utilizing the filmstrips. Information was obtained from teachers completing the questionnaire about the possible development of other instructional filmstrips on photo-offset lithography units. Evaluation sheets provided for the teachers' assessment of the halftone and color filmstrips. Additional suggestions were indicated in a comment space on the survey instruments.

Major findings of the survey study were as follows:

1. A larger percentage of teachers checked "extremely needed" for units of color separation, duotone techniques, photographic filters, layout stripping for black/white and color, pressroom safety, offset copy preparation, and densitometry for reflection-transmission purposes.
2. The lowest percentage of responses under "extremely needed" and highest under "not required" was indicated for units of glass screen halftones, projection printing, deep etch platemaking and plate testing.
3. Teachers utilizing the halftone filmstrip specified an overall average evaluation of 46.7 per cent under "excellent," 45.9 per cent under "adequate," and 3.9 per cent under the "poor" rating columns.
4. Teachers utilizing the color filmstrip specified an overall average evaluation of 62.3 per cent under "excellent," 32.6 per cent under "adequate," and 3.5 per cent under the "poor" rating columns.

Order No. 71-8933, 132 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Morris (Last name), Allen (First name), Eugene (Middle name)

Exact Title AN ANALYSIS OF THE PERCEPTIONS OF STUDENTS WITH RESPECT TO THE MECHANICS, CONTENT AND UTILIZATION OF ARTICULATED INSTRUCTIONAL DEVELOPMENT BOOKLETS

Degree granted Ed.D., Date 1971 No. of pages in report 251

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The Problem

The multiple-activity approach to teaching industrial arts has gained considerable attention recently in the Province of Alberta. This organizational pattern necessitates that each student have precise learning materials available to him such that each may learn and progress at his own rate.

The purpose of this study was to identify the perceptions of students with respect to the Articulated Instructional Development booklets prior to the publication of the booklet series. Within the category of Mechanics the study attempted to identify the perceptions of students in relationship to format style, picture and script balance, sequence technique, and machine part identification. Within the category of Content the study attempted to identify the perceptions of students in relationship to the need and placement of a rationale, the need and importance of industrial relationship identification, the relevancy of material covered, concept subdivision, and the need for quality and safety controls. Lastly, within the category of Utilization the study attempted to identify the perceptions of students in relationship to the imposition of conformity, booklet dependency, internal booklet flexibility, evaluation procedure, and student-teacher contribution to booklet development.

Description of the Population

A random sample of 100 students was drawn from the total population of the eighth grade students enrolled in the Materials Section of the Calgary Plan during the 1970-71 school year.

Description of the Instrument

The instrument used to gather the data for this study was of Q-Sort design and contained twenty-four cards in each of the categories Mechanics, Content, and Utilization. Each of the seventy-two cards was prefaced by the statement: IN MY OPINION THE IDEAL AID WOULD: This statement was followed by the concern of the card and an illustrated example or picture to further clarify the intent of the card. A forced choice ranking system was employed. As a result of this procedure the twenty-four cards of each sort were rank ordered into a consecutive order of importance.

A fourth sort, comprising the first eight cards selected in each of the three sorts, was employed to determine the degree of consistency of the students' selection of cards.

The card statements and illustrations were developed by the writer with the aid of the Program Committees of the Calgary Plan.

Findings

The data gathered and analyzed showed that all groups agreed on five of the nine practices related to the Mechanics of the booklets. All groups ranked the practice of identifying machine parts with labels as the most important in this category.

Within the category of Content all groups agreed on five of the seven practices related to this category. Each group ranked the practice of having a "Power Equipment Check Point" used only once per machine in the first position.

Within the category of Utilization all groups agreed with seven of the nine practices related to this category. The practice of having different [illegible] such that students could select the order best suited to his

Conclusions

From the findings of this study it was concluded that the groups of students in the sample population had definite feelings as to the importance of standards with respect to the Mechanics, Content, and Utilization of the Articulated Instructional Development booklets. These feelings provided the basis for the establishment of a priority listing of the twenty-five standards related to the development of instructional materials employing pictorial content.

Order No. 72-3284, 251 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Morrisey (Last name), Thomas (First name), J. (Middle name)

Exact Title AN ANALYSIS OF THE ADMINISTRATIVE AND SUPERVISORY RESPONSIBILITIES OF EDUCATIONAL PERSONNEL WHO DIRECT THE OPERATION AND MAINTENANCE OF THE PHYSICAL PLANT WITH IMPLICATIONS FOR SELECTION AND TRAINING

Degree granted Ed.D., Date 1965 No. of pages in report 231

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To analyze the administrative and supervisory responsibilities of persons charged with directing the operation and maintenance of educationl facilities within selected public school systems in the North Central Association Area. To obtain opinions from School Superintendents employing these individuals with regard to the appropriate preparation that these individuals should possess.

Source of data and method of study:

Data for the study were obtained from interviews and a survey of supervisors of the physical plant and the School Superintendents employing these individuals in 66 selected school systems in the North Centra Association Area. Another 46 school systems outside this 150 mile radius, but within the North Central Association Area, were surveyed through information forms sent to the supervisors of the physical plant and the School Superintendents.

Findings and Conclusions:

1. These position will increase in number as the number and size of the school systems increase.
2. The position is likely to be immediately subordinate to the School Superintendent.
3. The type and number of lower-echelon positions increase as the size of the school system increases.
4. Individuals are typically employed on a twelve month basis for this postition.
5. Preparation in educational administration and industrial education seems desirable for individuals occupying this position.
6. Prior work experience in some phase of construction, education administration, or industrial educastion appears to be desirable for individuals occupying this position.
7. The position can be categorized into nine major areas of responsibility; administrative, maintenance, construction and repairs, inspection, personnel, purchasing, finance, records and reports, and legal matters.
8. In the opinion of school superintendents and identified body of general and specialized knowledge should be possessed by supervisors of the physical plant.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Moss (Last name), John (First name), F. (Middle name)

Exact Title A FOLLOW-UP OF DROP-OUTS AND GRADUATES OF SCHOOLS IN A REDEVELOPMENT AREA WITH IMPLICATIONS FOR VOCATIONAL EDUCATION

Degree granted Ed.D., Date 1962 No. of pages in report 221

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To make available information concerning the educational and occupational experiences of a group of high school drop-outs and graduates of schools located in a labor surplus area, this area receivein financial and technical aid under the Area Redevelopment Act.

Source of data and method of study:

Data used in this study were obtained largely from; 1) information forms completed by 1,339 former students of nine public high schools located in St. Francois County, Missouri who had either graduated or dropped out sometine during the school years 1955-7-to 1960-61; 2) records of the Missouri State Department of Education; and 3) Missouri State-Wide Testing Service.

Findings and Conclusions:

It would seem that the youth of St. Francois County are not being afforded equal educational opportunity.

A need exists for more adequate and effective vocational and educational guidance in the county high schools.

A majority of the high school graduates seek employment outside the county while a majority of the drop-outs remain in the county and also in the ranks of the unemployed.

Youth who leave the county are inclined to take more education and training than the youth who remain in the county.

Former graduates whose scholastic aptitude was below average constituted a majority of those unwilling to support vocational education, although, logically, this group would benefit most from this type of training.

The former students would favor offering trade and industrial training, technician training and cooperative vocational education during the last two years of high school or on the junior college level.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Mudzo (Last name), Michael (First name), George (Middle name)

Exact Title THE DEVELOPMENT OF A DECISION MODEL FOR STATEWIDE MANPOWER PLANNING RELATED TO VOCATIONAL AND TECHNICAL EDUCATION

Degree granted Ph.D., Date 1970 No. of pages in report 158

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

SCOPE OF STUDY: This study pertains to the development of a decision model for statewide manpower planning related to the vocational and technical education system. The decision model describes the vocational and technical education system and is used to aid in the formulation of mathematical procedures to be used in the decision process. The model provides a framework for classifying data obtained from the various manpower sources in the state and the data is arranged in a logical manner to improve the evaluation process. The model is based upon a manpower accounting procedure.

FINDINGS AND CONCLUSIONS: A mathematical model, which adequately describes the vocational and technical education system, was developed. The variables relating to the model were identified and their interrelationships were determined. The variable values can be measured so as to enable the use of quantitative techniques during the decision process. Two quantitative techniques used in the industrial engineering discipline were shown to be applicable to the vocational and technical education system. These techniques were the linear programming algorithm and the process control chart concept.

Order No. 71-11,236, 158 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Munger (Last name), Paul (First name), Rudolph (Middle name)

Exact Title A STUDY FOR THE ORGANIZATION OF AN UNDERGRADUATE FLUID MECHANICS LABORATORY PROGRAM

Degree granted Ph. D., Date 1972 No. of pages in report 172

Granted by University of Arkansas (Name of institution), Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

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This paper presents the results of an in-depth study and analysis of laboratory courses. The meaning and purposes of laboratories are outlined, as well as laboratory course objectives.

The fluid mechanics laboratory course is discussed, including topics for inclusion in the elementary course. An undergraduate fluid mechanics laboratory course outline is then proposed as an example to conform to the laboratory concepts presented. Order No. 72-10,189, 172 pages.

Findings and Conclusions:

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Murphy (Last name), James (First name), Owen (Middle name)

Exact Title THE DEVELOPMENT AND VALIDATION OF AN EMPIRICAL CRITERION-BASED SCORING KEY FOR ELECTRONICS TECHNICIANS ON THE MINNESOTA VOCATIONAL INTEREST INVENTORY

Degree granted Ph.D., Date 1972 No. of pages in report 103

Granted by Boston College (Name of institution) Chestnut Hill, Massachusetts (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

One of the persistent problems in the field of interest measurement is the question of whether or not a particular research endeavor aimed at developing a new scoring key or measuring device is worthwhile or justified. In his volume describing the development of the Minnesota Vocational Interest Inventory (MVII), Clark (1961) warns against the tendency toward premature closure in the field of interest measurement. There is a particular need in this field for longitudinal programs of research since vocational choice is seen not as a momentary event but as a long-term process. Moreover, occupations change and develop. Revisions of existing instruments become necessary and new scales may be added as the need is felt. Such was felt to be the case as the rationale for this research. The field of electronics has grown and expanded greatly in scope in the twenty five years since Clark developed the MVII in 1946-47. While it includes the maintenance of electronic equipment as one of its functions, the field of electronics is now much more involved with technology and engineering functions. Thus, the Radio-TV Repairman scale on the MVII was felt to be inadequate for vocational counseling purposes for those who might be interested in the field of electronics. The MVII is one of the few instruments specifically geared to use with clients who are oriented to skilled trades occupations and the need for trained technicians in industry seems to be growing while the dropout rate from vocational high schools and technical institutes is relatively high. There is thus a great need to direct vocational guidance efforts at this level. There is a need for ongoing, longitudinal research and the establishment of local normative data to assist guidance workers.

Having established the rationale for such a study as this one, the next issue becomes what should be the nature of the new scale which is to be developed. The MVII format was followed in using items weighted plus or minus 1 based on percentage difference choices between a criterion and a reference group. This is an empirical procedure which results in a scale heterogeneous in item content rather than a homogeneous scale which is factorially derived. While there are criticisms of both approaches to scale development, the present weight of evidence seems to be in favor of continued use of the heterogeneous technique.

A total of 800 subjects from Wentworth Institute in Boston were used for this study. Half of these were enrolled in various electronic curriculum programs and half were enrolled in a variety of other programs. Each of these two groups was again divided in half for purposes of construction of the empirical scale and cross-validating it. Wentworth Institute was considered a highly representative source of subjects for skilled trades interests comparisons.

Items were chosen for the empirical electronics scale on a percentage difference basis. Items chosen more or less than the reference group by a difference level of 21% or greater were selected for the scale and weighted +1 (for items chosen more frequently) or −1 (for items chosen less frequently). Twenty one per cent was chosen as the cutoff point as recommended by Clark (1961) as being the point at which the optimum number of scale items would result relative to scale reliability considerations. Mean differences were highly significant on cross-validation (all beyond .0005), and test-retest reliability over a five month period with an N of 100 was also high at .88.

It is concluded that this empirical electronics scale has demonstrated sufficient validity and reliability to warrant further cross-validation and use for vocational guidance purposes, at least in the New England area.

Clark, K.E. *Vocational interests of nonprofessional men.* Minneapolis: University of Minnesota Press, 1961.

Order No. 72-22,751, 103 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Myers (Last name), Roy (First name), Earl (Middle name)

Exact Title THE RELATIONSHIP OF THE MEAN VALUE THEOREM TO A COURSE IN ELEMENTARY CALCULUS FOR THE APPLIED SCIENCES

Degree granted Ph.D., Date 1971 No. of pages in report 194

Granted by University of Pittsburgh (Name of institution), Pittsburgh, Pennsylvania (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

It is the purpose of this paper to consider the relationship of the Mean Value Theorem (MVT) to a course in elementary calculus for applied science students. "Elementary Calculus" was used to describe the courses Math 61, 62, 71 at the Pennsylvania State University. Within the context of the course outlines, texts, and educational philosophy of these courses it was intended to determine the role of the MVT..

Following a brief history of some of the results related to the MVT, behavioral objectives were written for the calculus. These were then analyzed for prerequisites. In particular, those objectives related to the MVT were determined.

From a set of theorems used for the presentation of the theory of the calculus, those theorems related to the MVT were extracted. Alternate methods of establishing some of these results were considered. Included here were several methods of proving the MVT. A recommended presentation of theorems was given and analyzed.

A summary of the relationship of the MVT to the theorems and objectives of the calculus suggests that the MVT is a significant result in the development of the theory of the calculus. While few objectives depend directly on the MVT, many are indirectly related, depending on theorems derived from the MVT. Suggestions that the MVT be deleted from the calculus, or be replaced by a weaker result, were considered and rejected.

Finally, a means of presenting the MVT to applied science students was given.

The Appendix contains proofs and examples, mostly related to the history of the MVT and related theorems.

Order No. 72-16,056, 194 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Nash (Last name), McKinley (First name), Merchand (Middle name)

Exact Title AN INVESTIGATION OF THE RELATIONSHIPS OF KNOWLEDGE OF OCCUPATIONS AND THE EDUCATIONAL, PERSONAL, AND SOCIAL CHARACTERISTICS OF BLACK SECONDARY STUDENTS

Degree granted Ed.D., Date 1972 No. of pages in report 160

Granted by University of Illinois (Name of institution), Champaign-Urbana, Illinois (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To expand the objective evidence that is available pertinent to Black students' knowledge of occupations; to provide objective evidence of the amount of knowledge of the occupations possessed by southern Black male secondary students; To provide information concerning the relationship of selected educational, social, and personal characteristics with the amount of knowledge of occupations possessed by southern Black secondary students; and to provide educational planners, administrators, and counselors with data to assist them in the development of programs of occupational information that are relevant to the needs of Black Teen-agers.

Source of Data and Method of Study:

This study was based upon data collected from 10th grade boys enrolled in a predominately Black high school in a southern metropolitan area. The data was collected by a questionnaire which included the Parnes Occupational Information Test and the Sims Sci Occupational Rating Scale. Data was also collected form the school records of the subjects.

Findings and Conclusions:

1. The subjects had limited knowledge and awareness of occupations.
2. Reading achievement was associated with the knowledge of occupations scores although all written material was read aloud to the subjects in a group setting.
3. The level of education of the head of household was associated with the knowledge of occupations as measured by the Occupational Information Test.
4. The subjects were not aware of the educational requirements of their aspired or expected occupations.
5. The educational and occupational aspirations of the respondents were not consistent with their educational programs.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Neff (Last name), William L. (First name), _____ (Middle name)

Exact Title A STUDY OF FEDERALLY REIMBURSED VOCATIONAL EDUCATION IN THE STATE OF NORTH DAKOTA

Degree granted Ed.D., Date 1941 No. of pages in report _____

Granted by Stanford University (Name of institution) Stanford, California. (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To show the growth and development of the federally reimbursed program of vocational education in the state of North Dakota from the passage of the Smith-Hughes Act in 1917 to the school year ending 1940; to examine and interpret this program rather broadly in the light of the state's natural resources and general occupational structure.

Source of Data:

Four fedearl acts were basic to this study: the Smith-Hughes Act, the George-Reed Act. These fedearl acts, together with the North Dakota Acceptance Act, constitute the authority for the program. The records anf files of the State Director of Vocational Education in North Dakota. The file and records of the State Supervisors in the specific fields frovided valuable information. Important data have also been secured from the State Advisory Board, the State Statistician, and the Biennial Reports of the Superintendent of Public Instruction. State publications.

Findings and Conclusions:

Federal assistance has to a marked degree extended the benefits of vocational education to the people of North Dakota. Provision is made for teacher training in distributive education at the State University, while the State School of Science provides for the training of teachers in the trades. The curriculum for training teachers in trades and industries places practically all of the emphasis upon competence in the trades. An excellent plan for in-service training is provided for all of the teachers of vocational subjects. The program of vocational home economics is reaching a greater number of people than any of the other vocational programs. The recently inaugurated plan of training for domestic service is an encouraging recognition of the needs of the large number engaged in this type of work. The centralized state plan endeavors to meet in a practical way the particular needs of a state which is predominantly rural. The adult program in trades has been spotty and irregular throughout the state with the exception of that part of the offerings at the State School of Science. Some progress has been shown in the adult division of distributive education, but the co-operative part-time program is as yet undeveloped, and while the state plan for occupational information and guidance is still in the process of formulation, and excellent beginning has been made for this much-needed service. The findings of this study indicate that means should be provided wherby the federally reimbursed program and especially the program in vocational agirculture may be more comprehensive in its benefits.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Nestor (Last name), Harold (First name), Meredith (Middle name)

Exact Title DEVELOPMENT OF OPERATIONAL CRITERIA FOR A STATE GOVERNING AGENCY FOR TWO-YEAR POST-SECONDARY, CAREER-ORIENTED TECHNICIAN EDUCATION IN OHIO

Degree granted Ph.D., Date 1971 No. of pages in report 247

Granted by The Ohio State University (Name of institution) Columbus, Ohio (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The study was designed to develop proposed operational criteria for a state agency responsible for two-year, post-secondary, career-oriented technician education programs in Ohio and to determine the position of these programs within the overall educational spectrum within the United States.

Participants from the field were state superintendents for public instruction, state directors of vocational education, state coordinators for development of community and junior colleges and presidents or directors of community colleges, junior colleges, vocational-technical institutions and four-year institutions. The respondents provided relative information through the use of questionnaires which were designed for each category of participants. A jury composed of technical education administrators in Ohio was appointed to evaluate the proposed operational criteria.

The study proposed sixty-three operational criteria for a state agency responsible for two-year technician education with a suggestion for revision of the state educational structure. An alternate plan was also presented which proposed restructuring of the Ohio Board of Regents administration operations.

Basic conclusions reached in the study were: 1. The proposed criteria were workable and acceptable. 2. An in-depth orientation program is needed for staff members. 3. The majority of administrators were satisfied with their governmental structure. 4. Technician education programs were accepted as two-year college programs. 5. Many states were developing a system of comprehensive community colleges. 6. Accountability requirements were much greater for technician education programs subsidized by state funds.

Order No. 72-15,266, 247 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Nichols, Jr. (Last name), George (First name), Vernon (Middle name)

Exact Title AN EXPLORTORY STUDY OF THE CORRELATION AMONG SELECTED PSYCHOLOGICAL FACTORS AND THE UNSAFE BEHAVIOR OF STUDENTS IN METALWORKING

Degree granted Ed.D., Date 1971 No. of pages in report 196

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this investigation was to examine the relationship between: (1) selected psychological factors and (2) the unsafe behavior of students in performing laboratory activities in metalworking. The psychological factors analyzed in the research were: (a) ability to perceive hazards, (b) aspiration to behave safely, (c) intelligence, (d) experience in metalworking, (e) spatial perception, (f) mechanical comprehension, (g) attitude toward safety, (h) knowledge of metalworking safety, and (i) achievement in metalworking.

An additional objective of the study was to determine the correlation of selected psychological factors that were under consideration with: (1) students' ability to perceive hazards and (2) their aspiration to behave safely. The correlation between these factors was also examined.

A sample consisting of thirty-four students enrolled in the Department of Industrial Education at Murray State University was chosen for the research. The instruments used to examine the psychological factors that were included in the study consisted of: (1) selected standardized tests and (2) specially developed measuring instruments. Criteria representing the unsafe behavior of students were based on the number of (a) accidents, (b) minor injuries, and (c) unsafe acts they experienced during selected periods of time. Records of these incidents were accumulated by observing their occurrence on recorded video tapes of behavior.

Five null hypotheses were formulated and tested in the execution of the study. A statistical analysis of the data was performed using Pearson product-moment correlation. The computed coefficients of correlation led to the following conclusions:

1. There was no significant correlation between the number of accidents incurred by students in metalworking and the psychological factors measured in this research.
2. A low positive correlation was obtained between the number of minor injuries experienced by students and their knowledge of metalworking safety. This criterion of behavior did not appear to be related to any of the other psychological factors as they were measured in the study.
3. The number of unsafe acts committed by students was found to be negatively related to students' achievement in metalworking. No significant correlation was found between unsafe acts and the other psychological factors examined.
4. The ability of students to perceive hazards that may arise or exist in the performance of metalworking activities was determined to be positively correlated with their experience in metalworking. This ability did not seem to be related to the other psychological factors that were measured.
5. Students' aspiration to behave safely was found to be positively related with their measured achievement in metalworking and their ability to perceive spatial relationships. There appeared to be no significant correlation between safety aspiration and the other psychological factors studied.

Order No. 72-13,262, 196 pages.

SOURCE SHEET FOR [illegible] OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Nothdurft (Last name), Marie (First name), E. (Middle name)

Exact Title INDUSTIRAL ARTS AS AN INSTRUCTIONAL AID IN TEACHING MENTALLY RETARDED STUDENTS IN THE LARGE MISSOURI SECONDARY SCHOOLS.

Degree granted Ed.D., Date 1972 No. of pages in report 180

Granted by University of Wyoming (Name of institution) Laramie, Wyoning (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

It was the purpose of this study to bring together information concerning present practices and opinions as to educational provisions made for educable mentally retarded pupils in the area of industrial arts, grades seven through twelve, and to analyze the data to ascertain desirable practices in the implementation of a program of industrial arts.

Source of data and method of study:

Data pertaining to the problem were obtained by a comprehensive review of literature; review of dissertation abstracts; a study of Federal and State of Missouri legislative action; a review of court actions in related cases; interviews with authorities in the area of industrial arts and special education; and by use of a questionnaire. The survey was made to determine the practices currently in use in AAA and AA school in Missouri, exclusive of those included in Special Districts, in providing industiral arts experiences and whether there was a need for suggestions to be used in a course of study. A 75 percent response to the quistionnaire, which required checked and short answer responese, was received from the population.

Findings and Conclusions;

Industrial arts experiences are not being provided as an integral part of the secondary curriculum for all EMR pupils. Integration of EMR pupils with regular classes appears to be the most prevalent administrative model in use. The general shop organization plan is predominately used in making industiral arts experiences available to EMR pupils. Rules and regulations should be applicable to all pupils alike when integration of EMR pupils with regular classes is practiced. A wide diversity is noted in major areas of work in which EMR pupils participate. The individual project method is adjudged a successful curriculum approach and the project should be pupil selected with teacher approval. A well delineated plan offering a sequence of skills should be pursued in making IA provisions for EMR pupils. Printed material should be limited, possibly to simplified drawings. The time alloted presentation of content material should be small in comparison to actual "doing" activities. The lack of qualified personnel limits the expasion of present IA programs for the EMR pupil.. Special education teachers and industrial arts teachers alike feel the need for help in planning industrial arts experiences for educable mentally retarded pupils.

On the basis of the data provided in this study, suggestions were made to aid in the preparation of a course of study for EMR pupils on the secondary level.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author O'Connell (Last name), John (First name), Frederick (Middle name)

Exact Title THE LABOR MARKET FOR ENGINEERS

Degree granted Ph.D., Date 1971 No. of pages in report 164

Granted by University of Wisconsin, (Name of institution) Madison, Wisconsin (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The work of the economist in the study of engineers has concentrated primarily on the supply-side of the labor market. Particular attention has been given to the earnings variable and its relation to the education and training of engineers. This study looks at the labor market for engineers in a context in which both demand and supply functions are investigated and estimated. The specific objectives of this work are: to develop and estimate demand and supply schedules for engineers; to analyze the importance of theoretically relevant variables in the market equilibrating process; and to analyze, from both the demand and supply-side, the complementarity or substitutability of engineers and people in related occupations.

Multiple regression techniques, consisting of ordinary least squares and two-stage least squares, are used to accomplish the above objectives. Two tests of the model are developed: the first utilizes cross-section data with the state as the unit-of-observation; the second employs both time-series and cross-section data with the industry as the unit-of-observation. The model developed is applied to electrical, mechanical, civil, and other technical engineers, and to engineers in total. Essentially the analysis is a comparative static one; however, a number of simple lagged earnings variables are introduced.

On the demand-side the following results emerge: the relative own-price elasticity of demand for all kinds of engineers is generally negative though not statistically significant; scientists tend to be substitutable for engineers while individuals in occupations requiring less formal education than engineers - technicians, designers and draftsmen - tend to be complementary inputs; research and development expenditures are a statistically significant determinant of employment in all cases except that of civil engineers; the industrial-occupational mix tends to be significant, except in the case of civil and electrical engineers.

On the supply-side the following occurs: the absolute own-price elasticity of supply is generally positive and statistically significant in the geographic model but not significant in the interindustry model; non-pecuniary aspects associated with a geographic area tend to be a positive though not statistically significant determinant of the supply of engineers; the engineering content of the educational system is generally a significant supply determinant.

A number of policy implications emerge. Geographic reallocations in the supply of engineers may be accomplished through the earnings variable. On the other hand, earnings do not prove significant in determining interindustry allocation patterns. On the demand-side, rather considerable changes in relative earnings are unlikely to have a statistically significant impact on the quantity of engineers demanded. Programs designed to eliminate inadequacies in the supply of engineers should be directed at increasing the number of engineering degrees conferred. Individuals in related occupations, but requiring less formal education, tend to be complementary rather than substitute inputs. Finally, the instability of research and development expenditures leads to an unstable demand for engineers.

Order No. 71-5658, 164 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Odbert (Last name), John (First name), Turner (Middle name)

Exact Title STUDENT AND FACULTY PERCEPTIONS OF ORGANIZATIONAL VARIABLES AND SUPPORTIVE RELATIONSHIPS WITHIN TWO ILLINOIS COMMUNITY COLLEGES

Degree granted Ph.D., Date 1973 No. of pages in report 146

Granted by University of Illinois (Name of institution) Champain-Urbana, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To measure and analyze the perceptions of students and faculty members of organizational variables and of supportive relationships within two Illinois community colleges.

Source of data and method of study:

Data was obtained from 655 students and 152 faculty members through the use of a questionnaire.

Findings and Conclusions:

There is a significant difference between the perceptions of students and faculty members of the organizational variables.

There is a significant relationship between perceptions of organizational variables and supportive relationships.

The organizational theories of Likert are applicable for research in the community college.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ogle (Last name), Lewis (First name), Wayne (Middle name)

Exact Title A STUDY OF A COMMUNITY COLLEGE PROGRAM BASED ON THE PERCEPTIONS OF OCCUPATIONAL AND TRANSFER STUDENTS

Degree granted Ed.D., Date 1971 No. of pages in report 159

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary purpose of this study was to determine the relative effectiveness with which the four main components of the overall program of a particular community college—the general education program, student personnel services, student activities program, and the instructional program in the major areas—fulfill the needs of students enrolled in occupational programs as compared with students enrolled in transfer programs according to the perceptions of the students.

Secondary purposes of the study were to assess the students' perceptions of the four main components of the overall program and certain related objectives (as stated in institutional publications) when students were grouped according to curriculum choice (occupational or transfer), class level (freshman or sophomore), and academic ability (high or low), and to determine the interaction effect of curriculum choice, class level, and academic ability upon students' perceptions pertaining to the four components of the program.

A Likert-type rating scale containing 152 items was administered to 200 randomly selected students. Responses were transferred to mark sense forms, punched on IBM data cards, and treated as scores. Sums of scores for all items of the four components, and for items related to each of the objectives in the four components were used in an analysis of variance of a 2x2x2 factorial to test the null hypotheses that there were no differences in the perceptions of the various student groups. Statistical analyses of these data were done on the IBM 360 series computer at the University of Missouri Computer Center.

Thirty of the selected students were interviewed, and these data were also tabulated and reported statistically.

Conclusions based on the findings were:

1. The general education program, the student personnel services, and the courses in the major area of study of a community college program meet the needs of occupational students and transfer students, about equally well, according to the perceptions of the students.

2. The perceptions that community college students have of the general education program are affected as much by the ability level of the students as by their choice of curriculum.

3. The transfer students perceive greater opportunities for personal enjoyment and satisfaction through participation in the student activities program than do occupational students.

4. The occupational group of students perceive the programs of student organizations and student government as meeting their needs to a higher level of satisfaction than do the transfer students.

5. The way community college students perceive the attainment of the criteria related to the courses of the major area of study is affected more by the ability level of the students than by their choice of curriculum.

6. The high-ability student groups are more satisfied with courses in their major area, with the definition of instructional objectives, with the pertinence and reasonableness of assignments, and with the fairness and appropriateness of tests and grades than are low-ability students.

7. The high-ability student groups are more satisfied with the concern their instructors have for them as individuals than are low-ability students.

8. The general education program and the major area courses meet the needs of both the transfer students and the occupational students to a greater degree than does the student personnel services component.

Order No. 72-10,560, 159 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author O'Hara (Last name), James (First name), S. (Middle name)

Exact Title INDUSTRIAL ARTS TEACHING-LEARNING UNIT GUIDELINES DEVELOPMENT BASED ON EDUCATIONAL SYSTEMS DESIGN

Degree granted Ed.D., Date 1972 No. of pages in report 170

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To determine whether a beginning industrial arts teaching-learning unit based on the problem solution guidelines developed using Educational Systems Design, could cause learning to occur at the higher cognitive leads as determined by the Florida Taxonomy of Cognitive Behavior.

Source of data and method of study:

To test the null hypothesis; two eight grade industrial arts classes were selected to participate in the experiment. A crossover experimental design was employed permitting each lcass to serve as both the experimental and control group.

Findings and Conclusions:

Students performed better at the three higher levels of the Taxonomy of Cognitive Behavior when subjected to the experimental treatment. When subjected to the control treatment they performed better at the three lower levels of the Taxonomy. The computed chi-square for both groups was significant at greater than the .05 level. The performance of both groups at the higher levels of the Taxonomy indicated that Educational Systems Design based instruction was a contributing factor in causing students to analyze, synthesize and evaluate during the learning process.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Oliver (Last name), George (First name), Leslie (Middle name)

Exact Title A CONCEPTUAL STRUCTURE FOR THE PLANNING VOCATIONAL CURRICULA

Degree granted Ph.D., Date 1970 No. of pages in report

Granted by University of Toronto (Name of institution) Toronto, Onterio (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )
National Library of Canada at Ottawa

The aim of this study is to help determine, within the context of recognized curriculum theory, what it is that the planners of vocational curricula do – or ought to do – in the process of systematically identifying and relating instructional means to ends.

The specific goal of the study is to develop a functionally based conceptual structure for relating educational means to ends at the "instructional level" of educational decision making, as this level has been described by J. I. Goodlad, and M. N. Richter, Jr. in The Development of a Conceptual System for Dealing with Problems of Curriculum and Instruction.

More specifically, in the language of Tyler, Herrick, Goodlad, and Richter the conceptual structure developed by this study provides an ordered set of concepts and related terms which indicate, to some extent, the assumptions and principles employed by curriculum planners as they attempt to systematically plan learning experiences, given unambiguous descriptions of a set of educational goals, and a set of learning situations.

The study is of the inductive type, using as its data sources the concepts, rationales, methods, and techniques described in the literature of the curriculum field. Under the assumption that the field of curriculum is a practical field of inquiry, a paradigm for generalized practical action is employed in the synthesis, interpretation, and testing of this data. This paradigm is developed in detail in the appendices to the study.

Four key concepts are identified as the basis upon which the theoretical concepts of the curriculum field are built, learning, education, instruction, and curriculum. Six theoretical concepts are identified as the basis upon which conceptual structures for curriculum planning activities are built, a learning situation, an educational goal, a learning experience, a subject, a subject matter, and a learning activity.

Based on the paradigm for practical action, these theoretical concepts and their subordinate concept categories are organized in a way which indicates the assumptions and principles used by curriculum planners as they move, in a complex iterated sequence of practical activities, from a state of relative ignorance to a state of relative sophistication about what "should" and "could", and what "can" and "will" be done to achieve a given set of goals in a given learning situation. This iterated sequence is made up of three board categories of planning activities, defining the learning situation, investigating the learning experience, and evaluating the learning experience. Each of these operations categories contains two subordinate categories yielding a total of six subordinate planning operations as follows: (1) defining value standards for the planning of learning experiences, (2) defining boundary variables for the planning of learning experiences, (3) designing the learning experience, (4) researching the learning experience, (5) design evaluation of the learning experience, and (6) acceptance evaluation of the learning experience. Each of these six task categories is further described in terms of a number of subordinate concepts which, to some extent, determine the objects, actions, or events which are employed by the planner in carrying out that particular curriculum planning operation. Each category is described in detail including examples of the practical importance and of the use of the concept.

To the extent that this conceptual structure accurately reflects the practice of vocational curriculum planners, it provides a basis for future inductive studies on the methodology of the curriculum field, and ultimately, a basis for developing comprehensive handbooks on the planning of vocational curricula.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Olsen (Last name), George (First name), Alfred (Middle name)

Exact Title PLASTICS TECHNOLOGY AND ITS IMPLEMENTATION IN INDUSTRIAL ARTS TEACHER EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 223

Granted by New York University (Name of institution), New York City, New York. (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PROBLEM

The problem of this investigation was to develop a program of instruction in plastics technology for industrial arts teacher education at the undergraduate level and to design a facility to support that program.

METHOD

To arrive at a solution of the problem, information concerning the status of technology in plastics within American industry had to be ascertained and the position of plastics instruction in industrial arts teacher education had to be identified.

To accomplish this two questionnaires were developed, one for industry and one for education. Each questionnaire was used in a separate survey and the data used to solve the problem.

The first survey was concerned with the plastics industry. In that survey one thousand twenty (1020) processing and allied concerns were selected at random from the *Modern Plastics Directory*. The selection was stratified on the basis of processing groups as identified in the directory and resulted in nine groups. These groups were:

1. Blow Molders
2. Casting Processors
3. Molders and Extruders
4. Molders of Foamed Plastics
5. Reinforced Plastics Processors
6. Thermoplastic Sheet Formers
7. Polyethylene Powder Molders
8. Unclassified Processors
9. Specialized Services

Each of the concerns selected was sent a questionnaire. A return of sixty percent (60%) within each stratification was established as a goal to be reached before the return would be considered satisfactory. The return, on an overall basis, reached a percentage of sixty-one point zero seven percent (61.07%) with all the groups exceeding the minimum except group nine.

The second survey was concerned with industrial arts teacher education and sought information relative to plastics instruction at the undergraduate level. In the educational survey one hundred sixty-three (163) industrial arts teacher education institutions offering degrees in industrial arts or industrial arts education were sent questionnaires. A return of sixty percent (60%) was established as a goal to be reached before the return would be considered satisfactory. The return reached a percentage of seventy-one point zero five (71.05%).

The data from the surveys were tabulated and evaluated. The information obtained was then used to establish a program of instruction and to design a teaching facility.

RESULTS

Using the data obtained from both surveys a sequential program of instruction comprising five courses was developed. One course was of a basic nature, two were on an intermediate level, and two were of an advanced nature. The courses were structured on a semester basis, offered for three undergraduate credits, and required five clock hours of class time per week. The courses were titled:

1. Introduction to the Plastics Industry
2. Molding and Forming I
3. Molding and Forming II
4. Plastics; Product and Mold Design, Development, and Construction
5. Plastics: A Directed Study

The program of instruction is such that it can be modified to suit the needs of the institution.

A facility was designed, using the data from both the surveys, to support the established program. The basic facility contains two thousand four hundred square feet (2400 sq. ft.), while associated rooms or areas contain one thousand six hundred eighty square feet (1680 sq. ft.) The total facility contains four thousand eighty square feet (4080 sq. ft.). A floor plan with equipment layout was prepared, as was an equipment list containing size and general specifications for installation.

When used together the program and facility present a basic package for instruction in plastics technology at the industrial arts teacher education level.

Order No. 72-20,681, 223 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Olson (Last name), Richard (First name), Roger (Middle name)

Exact Title CAREER PATTERNS AND JOB SATISFACTION OF POSTSECONDARY TECHNOLOGY INSTRUCTORS

Degree granted Ed.D., Date 1971 No. of pages in report 136

Granted by The Pennsylvania State University (Name of institution) University Park, Pennsylvania (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The overall purpose of the study was to determine the extent to which the concurrent design would lead to the identification of an array of predictive factors in the areas of vocational stability and job satisfaction for potential teachers of postsecondary technology subjects. The two major objectives within the rubric of this overall purpose were: (a) to investigate the characteristics of postsecondary technology instructors; (b) to identify predictors of vocational stability and job satisfaction for postsecondary technology instructors. Specific questions for which answers were being sought were: (1) What characteristics of postsecondary technology instructors are associated with vocational stability? (2) What characteristics of postsecondary technology instructors are associated with job satisfaction? (3) What characteristics of postsecondary technology instructors can be used for prediction of vocational stability? (4) What characteristics of postsecondary technology instructors can be used for prediction of job satisfaction?

Postsecondary technology instructors utilized in this study were employed by either The Pennsylvania State University (N = 127) or one of the public community colleges in Pennsylvania (N = 48). They taught in either the electrical/electronics technology (N = 88) or the drafting/design technology (N = 87) programs. The method used to obtain data for this study was a mailed questionnaire survey with a telephone follow up on nonrespondents. The questionnaire was made up of a biographical blank, Holland's Vocational Preference Inventory (VPI), Smith's Job Descriptive Index (JDI) and a work history form. Information was gathered in 1971 during the months of May and June.

Of the 175 technology instructors in the available population, 160 (91%) returned their questionnaires. Respondents were then screened out for various reasons (the main reason for omitting respondents was that their VPI profiles showed "extreme" response styles). An N = 67 was used for zero-order correlations and multiple regression analysis calculations.

Seven predictor variables were used in this study and they were obtained from the VPI and the biographical blank. The predictor variables included the Holland (VPI) variables of (1) congruency (X_1), (2) consistency (X_2), and (3) homogeneity (X_3), plus the biographical blank variables of (4) age (X_4), (5) educational level (X_5), (6) type of institution of present employment (X_6), and (7) curriculum presently teaching (X_7).

Six criterion variables were obtained from the JDI and the work history form. They include the variable from the work history form in the area of (1) vocational stability (Y_1), plus job satisfaction variables from the JDI in the areas of (2) administration (Y_2), (3) work (Y_3), (4) people (Y_4), (5) promotions (Y_5), and (6) pay (Y_6).

Zero-order correlations and multiple regression analysis (MRA) techniques were used to answer the questions that had been posed by the investigator. Full model regression analyses were performed for each criterion variable. Restricted model regression analysis were developed for those criterion variables where more than one predictor contributed unique information about the criterion variable.

Conclusions concerning the relationships between the predictor variables and the criterion variables used in this study were: (1) No evidence was found that the congruency (X_1) or consistency (X_2) variables were related to any of the criterion variables; (2) Evidence was found that homogeneity (X_3) was related to some aspects of job satisfaction. Specifically, homogeneity was positively related to pay satisfaction (Y_6); (3) Age (X_4) was the only predictor variable that was related to vocational stability (Y_1) as measured in this study. The older instructors were more vocationally stable; (4) Educational level (X_5) was positively related to the pay aspect (Y_6) of job satisfaction for the entire group. It also was positively related to the promotions aspect (Y_5) of job satisfaction for the older instructors (44 years and older); (5) The type of institution (X_6) was found to be unrelated to any of the criterion variables; (6) Some evidence was found to suggest that the type of curriculum (X_7) one teaches in may be a moderating variable for explaining pay satisfaction (Y_6).

Order No. 72-19,357, 136 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author O'Neil (Last name), Ivor (First name), Riley (Middle name)

Exact Title THE EFFECTIVENESS OF THE DIVERSIFIED SATELLITE OCCUPATIONS PROGRAM AND THE CAREER DEVELOPMENT PROGRAM IN THE GRANITE SCHOOL DISTRICT

Degree granted Ed.D., Date 1972 No. of pages in report 144

Granted by Brigham Young University (Name of institution), Provo, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study was conducted to determine the effectiveness of a vocationally oriented curriculum adapted to the secondary school program of the Granite School District as measured by selected tests and opinions of students, parents, teachers, and administrators associated with the program during the school year 1970-1971. The program was divided into two parts: (1) the development of academic skills through vocationally oriented tasks, and (2) a work experience program.

The results of the program indicated high school level students showed noticeable improvement in academic skills, positive attitudes toward environment, and attendance patterns but showed little change in level of anxiety. In the junior high school program improvement was shown in academic achievement and levels of anxiety, but no positive change was noted in attendance patterns and attitudes toward the environment.

Order No. 72-5756, 144 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author O'Neill (Last name), John (First name), Nicholas (Middle name)

Exact Title THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 192

Granted by University of Northern Colorado (Name of institution), Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The central problem of this study was to determine the feasibility of an information system designed to facilitate the exchange of information regarding locally produced instructional materials among institutions of higher education offering majors in industrial arts or industrial technology.

Method

Following a pilot study, a model was developed which represented a hypothetical information exchange system. The model consisted of the following three elements:

1. producing schools
2. schools in need of materials
3. a communication channel which would include the gathering and preparation of information about locally produced instructional materials for publication and distribution.

The hypothetical model was used to identify problems and raise questions that only potential participants in such a system could answer. During model development five criteria for feasibility were identified as being of paramount importance to the study.

1. The existence of locally produced instructional materials for industrial arts in higher education,
2. The availability of locally produced materials,
3. The need of industrial arts programs for locally produced materials,
4. The demand or willingness to use these materials by schools in need, and
5. The availability of an existing communication channel to gather and disseminate information regarding locally produced materials.

A thirty-five item survey instrument was developed to answer questions regarding the feasibility of such an information exchange system.

Collection of Data

The instrument was mailed to 213 chief administrators of industrial arts programs in higher education as identified by G. S. Wall in the 1970-71 *Industrial Teacher Education Directory*. The total population was reduced to 181 industrial arts administrators due to inapplicability of the study in five cases and due to a desire not to participate in the study on the part of an additional twenty-seven administrators. Replies were received from 128 industrial arts administrators for a 70 per cent return.

Findings and Conclusions

The study indicated that an information exchange system was feasible based on the satisfaction of all primary criteria.

In the area of existence of materials it was found that ninety-nine schools were either producing materials for individualized instruction or planning to do so in the next two years. Information received via the instrument indicated that a little more than two-thirds of industrial arts administrators in a position to make their locally produced instructional materials available were willing to do so. In terms of need and demand, over 90 per cent of the respondents indicated that they would make use of materials listed by a system of this type if materials were of sufficient quality, priced in reasonable comparison with commercially prepared materials, and adequate to their needs.

In regard to the communication channel, twenty-five administrators indicated that their school would take the responsibility of gathering and preparing data for publication regarding locally produced instructional materials. In terms of national organization participation, the American Industrial Arts Association and the Publications Committee of the American Vocational Association have each indicated that publishing this type of information comes within the realm of their responsibility. However, neither organization made a firm commitment regarding periodic publication of gathered material.

Each respondent who indicated a willingness to trade or sell his materials was asked to request and complete forms describing instructional materials which he was willing to trade or sell. Forty-nine industrial arts administrators requested over 300 of these forms implying that the first attempt at developing a list of materials for the proposed system would be successful. Those materials reported are listed in Appendix H.

The study also revealed that most reporting schools were capable of producing or reproducing the more popular types of media.

No provision for a method of evaluating instructional materials was included as an integral part of the study. The number of respondents in favor of evaluation of materials prior to listing rendered this aspect of the proposed system very important. Evaluation of listed materials will be necessary to system acceptance and success.

Based on the findings of this study, eighteen recommendations were made regarding the development of a system to facilitate the exchange of information regarding locally produced instructional materials among industrial arts programs in higher education.

Order No. 72-3292, 192 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Orlando (Last name), Frank (First name), Joseph (Middle name)

Exact Title THE STUDY OF TECHNOLOGY: CONCEPT-STATEMENTS FOR CURRICULUM DEVELOPMENT IN THE AREA OF MANUFACTURING

Degree granted Ed.D., Date 1972 No. of pages in report 172

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To develop concept statements in the area of manufacturing which could serve as a base for curriculum development for industrial arts teacher education programs utilizing technology as a discipline base.

Source of data and method of study:

An analysis of historical and contemporary literature dealing with the development of manufacturing in the United States. A matrix was constructed with the systems identified on one axis and the major factors affecting man's work-organization, work characteristics and tools on the other axis. For each of the points of instruction within the matrix concept statements were identified.

Findings and Conclusions:

Concept-statements structure provides a comperhensive conceptual base for the study of manufacturing. In addition to the study supports the following:

1. Specific concept statements can be developed, which provides a base for determining a curriculum structure in manufacturing.

2. Identification of (a) an evolutionalr sequence of specific systems and (b) conceptual understanding of these systems provides an effective and efficient means for studying manufacturing.

3. The study of work (its organiztion, work characteristics, and tools) provides a valid means for achieving technological literacy in the area of manufacturing.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Outcalt (Last name), Richard (First name), Melford (Middle name)

Exact Title ROLE PERCEPTIONS AND ROLE EXPECTATIONS FOR MAJOR RESPONSIBILITIES FOR THE DEVELOPMENT OF TEACHING COMPETENCIES IN THE NEW TRADE AND INDUSTRIAL TEACHER

Degree granted Ed.D., Date 1971 No. of pages in report 160

Granted by University of Cincinnati (Name of institution), Cincinnati, Ohio (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study: The purpose of this study was to investigate the roles of the local supervisor of trade and industrial education, the state trade and industrial teacher educator, and the trade and industrial teacher in terms of their respective responsibilities for improvement of instruction, as perceived by local supervisors, teacher educators, and experienced trade and industrial instructors. Under investigation, also, was the possibility of overlaps, omissions, or role conflicts in the concepts of the trade and industrial teacher education process.

The Design of the Study: The research method used was a comparison study, with data collected by a mailed questionnaire. The questionnaire contained 100 teacher competency statements and the respondents were asked to identify major responsibilities for development of each competency in the new teacher, both before and after issuance of the first provisional teaching certificate. Questionnaires were mailed to all of the local supervisors (73) and all of the teacher educators (31) in Ohio, and to a sample of experienced instructors equal in number to the local supervisor population. Of the 182 questionnaires mailed, 124 (68%) were returned. Analysis of the data at a 60% cutoff level provided an indication that major responsibilities could be identified as designated either to the local supervisor, the teacher educator, or the trade and industrial teacher. There was very little overlapping of responsibility delegation, but there were competency responsibilities that were not attached to a role position by any of the respondent groups. There were definite indications of role conflict revolving around the role perceptions and role expectations of the local supervisor position.

Findings and Recommendations: Analysis of the data resulted, in part, in the following findings.

1. Local supervisor, teacher educator, and experienced instructor respondent groups agreed upon major responsibility assessments for 70 of 200 competency designations (two designations for each item) at a 60% cutoff level.

2. There is evidence that there is role conflict between the supervisor's concept of his responsibilities and the disparities between this concept and the duties and responsibilities of his office as outlined in the state plan for trade and industrial education.

3. The teacher educator and experienced instructor respondent groups respectively had a stronger perception of their roles than the role expectations of the other two respondent groups for the positions.

4. There is a lack of agreement at the 60% cutoff level concerning responsibility assessment for 32 competencies. None of the respondent groups achieved a 60% figure for 28 competencies before or four competencies after issuance of the first provisional certificate, indicating another type of role conflict.

Some of the recommendations that were made based on the findings were:

1. Trade and Industrial Education Services, Division of Vocational Education, Ohio Department of Education, should conduct improvement of instruction workshops for local supervisors. The workshop agendas should include sessions on discussion of competency responsibilities, and a series of sessions devoted to appropriate methods of conducting on-going improvement of instruction programs.

2. Identification of competency responsibilities should be placed on the agenda of teacher educator workshops, to resolve teacher educator areas of responsibility.

Recommendations for Further Research: Areas for further research that were suggested by this study include:

1. Not enough is known about an appropriate division of labor for development of competencies in the new teacher. A study to identify degrees of responsibility or guidelines for shared responsibility seems in order.

2. A study to determine time allocations that local supervisors normally devote to the administrative, supervisory, and coordinative functions of their positions would be useful, with special reference to determining if the state plan is in realistic accord with the day-to-day demands of the tasks in the local supervisor position.

Order No. 72-4312, 160 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Paine (Last name), Harry (First name), W. (Middle name)

Exact Title REVISION OF A CURRICULUM IN A VOCATIONAL HIGH SCHOOL BY MEANS OF THE TRADE ANALYSIS APPROACH

Degree granted Ed.D., Date 1943 No. of pages in report 470

Granted by The University of Michigan (Name of institution) Ann Arbor, Michigan (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

This research covered a period from 1939 to 1943 and concerns the revision of a curriculum for a vocational high school as a part of the over-all curriculum revision work of the school. It outlines techniques and procedures followed to secure a valid analysis and workable, intercorrelating course outlines. The appendix of the dissertation presents the analysis, followed by shop and related subject course outlines, as well as sample instruction sheets of various types used to facilitate the teaching of the content suggested by the outlines.

Source of Data and Method of Study:

(Macomber Vocational High School, Toledo, Ohio.) A trade analysis approach was used to describe the techniques used in revising a curriculum in a vocational high school.

Findings and Conclusions:

Materials developed in the curriculum revision are listed. The curriculum revision project has led to greater understanding between trade and related subject teachers, and greater agreement on school objectives.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Patterson (Last name), John (First name), Robert (Middle name)

Exact Title COMPARATIVE STUDY OF FRESHMEN COLLEGE BRANCH STUDENTS AND FRESHMEN TECHNICAL SCHOOL STUDENTS IN THE STATE OF OHIO

Degree granted Ed.D., Date 1970 No. of pages in report 133

Granted by The University of Akron, (Name of institution) Akron, Ohio (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study. The purpose of this study was to identify what differences exist between 1969 freshmen students of college branch academic centers and two-year technical schools in the state of Ohio.

Method of Research. Data for the study were obtained by randomly sampling 10 per cent of the 1969 freshmen enrollments of four college branches and four technical schools in the state of Ohio. A total of 220 branch campus students and 289 technical school students were involved in the study.

An analysis of variance test was performed on the scores of the ACT for both males and females. Duncan's multiple range test was used to analyze the four subtest scores of the males and females of the two groups, and the chi-square test of independence was applied to certain personal and background characteristics.

Summary of Results. The design of this study was based on the testing of four null hypotheses with the following results.

Hypothesis 1-The ACT subtest scores for the freshmen males were analyzed by an analysis of variance which revealed no significant difference at the .05 level.

The results of the analysis of variance for the females indicated a significant difference between the two populations. Duncan's test revealed that natural science was the only subtest to differ significantly at the .05 level.

Hypothesis 2-The chi-square test was applied to high school ranks expressed in quartiles of the two populations. There was no significant difference found between the males or females in branch colleges and those in technical schools.

Hypothesis 3-Students were classified by their father's or guardian's occupation by using the McCall's status ranking scale. The chi-square test was applied to determine if there was any difference between the groups. There was no significant difference found for either the freshmen males or females in the college branches or technical schools.

Hypothesis 4-A summary of the results of the chi-square tests for the personal and background characteristics used in this hypothesis are itemized in the following:

A. No significant difference was obtained when comparing the two groups of the study with respect to age.

B. There was a significant difference found between the two comparison groups with respect to sex distribution.

C. No significant difference was found in comparing the two groups with respect to marital status.

D. Admission status as represented by the percentage of high school graduates was found not to vary significantly between the two groups.

E. There was no significant difference obtained between the two groups with respect to year of high school graduation.

Conclusions. Based on the results of the study these conclusions were drawn: (1) College branch females demonstrated a greater potential for achievement of college level work than did the females of technical schools while both groups of males demonstrated an equal potential. (2) Males and females of the two groups are very similar with respect to high school rank. (3) Students of the two groups are from very comparable socio-economic backgrounds. (4) The two populations are very similar with respect to age. (5) Technical schools are serving a larger percentage of males than females in the state of Ohio, while the college branches have a nearly equal sex distribution. (6) The percentage of married students enrolling in the two institutions is nearly the same. (7) All students in both the college branches and the technical schools are high school graduates or equivalent. (8) The majority of the student populations enroll in college branches and technical schools immediately following high school graduation, and both populations are very similar with respect to the year of their high school graduation.

Order No. 71-16,284, 133 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Payzer (Last name), Marvin (First name), Francis (Middle name)

Exact Title INDUSTRIAL ARTS IN CATHOLIC EDUCATION

Degree granted Ed.D., Date 1954 No. of pages in report 178

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study is to provide and interpret information concerning the place and the relationships of the industrial arts in Catholic education. It is an attempt to provide a semantic reorientation of basic industrial arts formulations and practices for educators, especially Catholic educators.

The interpretation of industrial arts in Catholic education is discussed under such headings as (1) the map called education; (2) the map called industrial arts; (3) some reasons Catholic schools do not have more industrial arts; (4) the values of industrial arts; (5) methods of education and industrial arts; (6) levels of industrial arts; (7) content of Catholic industrial arts; (8) some types of industrial arts laboratories; (9) planning the industrial arts shop; (10) some dangers and low points of industrial arts; (11) industrial arts and vocational education; (12) industrial arts and life adjustment.

The study suggests a rather new formulation for the definition of the industrial arts as an educational medium. It suggests that the "transformation of the student thru the student transforming materials" is the dominant theme and not "the study of industry."

To supplement and supply information about beliefs and practices of Catholic educators regarding the industrial arts a survey was taken and the results reported under such headings as (1) Catholic viewpoints of industrial arts; (2) conflicts of industrial arts with accepted Catholic policies; (3) industrial arts and vocational education; (4) Catholic "history of craftsmanship in materials" and its loss in modern Catholic education; (5) some reasons for not having industrial arts in the Catholic schools; (6) future planning concerning industrial arts; (7) clubs that have crafts as a working basis; (8) books or articles helpful to Catholic educators; (9) information and materials desired by Catholic educators; (10) values of industrial arts as seen by Catholic educators; (11) opinions of Catholic educators as to what industrial arts will do for schools; (12) opinions of Catholic educators regarding skills and building knowledge; (13) courses of industrial arts offered by Catholic schools reporting; (14) instructor status as reported by schools having industrial arts; (15) opinions of Catholic educators on sending students to public schools for industrial arts experiences; (16) topics of a proposed study on industrial arts considered important by Catholic educators; (17) beneficial results to students because of inaugurating industrial arts; (18) reactions of Catholic educators to offering industrial arts to girls; (19) areas of industrial arts which seem to have promise for girls according to Catholic educators; (20) suggestions and remarks regarding the inquiry; (21) summary of the inquiry.

Generally, the inquiry provided information desired, such as (1) there seem to be no basic conflicts between the industrial arts and Catholic policy; (2) values, as interpreted by Catholic educators, are not the main obstacles to the provision of more industrial arts; (3) industrial arts and vocational trade training are as confusing to the Catholic educator as they are to educators everywhere; (4) most Catholic educators would welcome information about the various phases of planning and justifying the industrial arts; (5) most Catholic educators would welcome some type of building experience in their training; (6) most educators would approach with caution the practice of sending Catholic students to public schools for industrial arts experiences; (7) a complete survey of industrial arts in Catholic schools would bring much advance and progress to light; (8) a growing number of Catholic educators are becoming acquainted with the industrial arts and are capable of positive statements regarding them.

178 pages. $2.23. MicA54-1540

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Peiffer (Last name), Herbert (First name), Claire, Jr. (Middle name)

Exact Title VOCATIONAL EDUCATION IN CALIFORNIA UNDER THE FIRST COMMISSIONER OF INDUSTRIAL AND VOCATIONAL EDUCATION

Degree granted Ed.D., Date 1939 No. of pages in report 317

Granted by Stanford University (Name of institution) Stanford, California (City. State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

A rewiew of the development of vocational education in California from 1900 to 1925. Significant trends are stressed.

Source of data and method of study:

The historical method is employed, and conclusions are based upon evidence as contained in approximately two hundred original sources, supplemented by additional sources of a secondary nature. Federal documents, state documents, municipal documents, yearbooks and proceedings of special associations, periodical writings, special studies, and bulletins and circulars of selected public and private California schools represent the major source materials consulted.

Findings and Conclusions:

In its historical setting, modern vocational education rests upon the broad foundation of the time-honored system of apprenticeship.

When changes in the organization of the State Board of Education were made possible by an amendment to the constitution of the state in 1912, forces favorable to vocational educastion were able to effect the creation of the position of State Commissioner of Industrial and Vocational Education and thus to give head to the movement for vocation education in California.

The decade of service of the first California Commissioner of Industrial and Vocational Education was characterized during its first four years by promotion activities on behalf of a state program of vocational educastion, during the next four years by an expansion of the essential functions of the program, and during the final two years by a consolidation of the gains achieved.

Discernible major tendencies of the California vocational educastion movement arising out of the decade of 1913-1923 included the trend toward greater service to employed persons, the trend toward increased public support, the trend toward higher standards for teachers, the trend toward co-operative courses, the trend toward greater enrollments in vocational classes, the trend toward long-term planning of vocational programs, and the trend toward closser adherence to genuine vocational standards.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Petersen (Last name), Molen (First name), Larry (Middle name)

Exact Title A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION

Degree granted Ed.D., Date 1971 No. of pages in report 184

Granted by University of Missouri (Name of institution) Columbia, Missouri (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE:

To compare the relative effectiveness of two approaches used to present occupational information as well as, to ascertain and compare the costs of materials, equipment, and other resources involved in the two approaches of disseminating occupational information to students. More specifically the study attempted to answer the following questions:

(1) To what extent does the vocational maturity of students who have been exposed to occupational information through video presentations differ from those who received occupational information from audio cassette-cartridges?
(2) To what extent does the attitude of students who have been exposed to occupational information through video presentations differ from those who received occupational information from audio cassette-cartridges toward those persons who receive their occupational preparation from vocational schools?
(3) To what extent does informational achievement of students who have been exposed to occupational information through video presentations differ from those who received occupational information from audio cassette-cartridges?
(4) To what extent does retention of knowledge of students, at the end of a thirty-day period, who have been exposed to occupational information through video presentations differ from the retention of knowledge of those who received occupational information from audio cassette-cartridges?
(5) To what extent do the video and audio presentations of occupational information have a differential effect upon students of high and low ability?
(6) To what extent does preference of an occupation by students who have been exposed to occupational information through video presentations differ from those who received occupational information from audio cassette-cartridges?
(7) To what extent do the costs of preparing, securing, and presenting occupational information using video tapes differ from those involved in using audio cassette-cartridge tapes?

METHOD OF RESEARCH:

This investigation was conducted as a two group experimental study. Data were collected from 170 ninth grade students of the Logan Junior High School, Logan, Utah during the first semester of the 1970-71 school year.

Video and audio cassette tapes of sequences of occupational information comprised the treatments that were presented. Cost data were gathered from both treatment groups for purposes of a cost analysis. Data gathered from Crites' Vocational Development Inventory Scale, Remmers' Attitude Scale, an Occupational Preference instrument, Informational Achievement, and Information Retention Tests were analyzed for differences [illegible] Analysis of variance was [illegible] to test the differences between the two groups. Post significant [illegible] method of multiple means comparison was used to compare the differences within the groups. Chi square was used to compare occupational preference changes. Confidence level of .05 was the standard used for rejecting the null hypotheses.

SUMMARY OF THE FINDINGS:

(1) The data failed to reveal a significant difference among the scores of either treatment group.
(2) The cost-effectiveness analysis revealed a cost difference with audio cassette presentations costing less.
(3) The data revealed that students receiving occupational information using video tapes indicated more occupational preference changes.

CONCLUSIONS:

(1) Occupational information can be presented by either video or audio cassette tapes without an adverse effect on the students' vocational maturity or attitude.
(2) Either approach to disseminating occupational information could be utilized without detrimental effect upon the students' acquisition of occupational information.
(3) School officials could use either treatment realizing there would be no differential effect upon students of differing abilities.
(4) Video tape presentation of occupational information will result in more occupational preference changes by students.
(5) Audio cassette tapes are a relatively inexpensive means of disseminating occupational information as compared to video tapes.

Order No. 72-10,561, 184 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Pfahl (Last name), Alvin (First name), Kenneth (Middle name)

Exact Title A STUDY OF ATTITUDE AND TEACHING PERFORMANCE OF DEGREE AND NON-DEGREE TEACHERS IN INDUSTRIAL EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 104

Granted by Oregon State University, (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of the Study

The study was designed to determine whether the amount of formal education industrial education teachers have completed does affect their (1) attitude toward teaching and (2) performance in the classroom. The specific questions formulated to investigate this research were:

1. Will the amount of formal education a teacher has completed affect his attitude toward teaching?
2. Will the amount of formal education a teacher has completed affect his classroom performance?
3. Is there a relationship between a teacher's attitude toward teaching and his performance in the classroom based on the amount of formal education he has completed?

The purpose of this study was to determine if teachers with differing amount of formal education have a varying attitude toward teaching and whether this affects their teaching performance.

The major significance of the study was to investigate whether students taught by non-degree persons are receiving equivalent instruction as compared with those being taught by instructors with a degree.

Procedure

The selected population of 228 industrial instructors participating in the study were from Oregon's community colleges, secondary schools and skill centers. One hundred forty-nine instructors completed and returned instruments resulting in a 65% return. A total of 140 returns were complete and usable in the study.

The selected variable population groups of instructors were persons having completed 25 or less quarter hours of professional preparation (Ia), those having completed more than 25 quarter hours but less than a baccalaureate degree (Ib), and those who have completed a baccalaureate degree or more (II).

Each of the participating instructors was self-examined with the Vocational Industrial Teacher Attitude Scale (VITAS) to determine his attitude toward his teaching responsibilities. The teachers' classroom performance was student assessed using a questionnaire with questions designed for this purpose.

Instructors responded individually to the 72 items on the VITAS. Each instructor engaged one of his classes to rate his performance. From these ratings, ten responses were randomly selected for scoring.

Analysis of Data

The analysis of variance was used to analyze the statistical significance of the hypotheses concerning instructors' attitude toward teaching and performance in the classroom. The Pearson-product moment correlation was run to determine if there was correlation between attitudes toward teaching and rated teaching performance.

Selected Findings

1. The results of this study indicated there was no difference in attitude toward teaching among the experimental groups. According to the VITAS scores in this study, a baccalaureate degree does not indicate a substantially different or more positive attitude toward teaching industrial education.
2. Based on student assessment of teaching performance, non-degree Oregon industrial education instructors received better ratings than the instructors possessing a baccalaureate degree ($p < .10$).
3. Industrial education instructors having completed more than 24 hours formal preparation but less than a baccalaureate degree had a higher correlation of attitudes toward teaching compared with teaching performance than the two other experimental groups. The other groups had very low correlation.
4. This study has produced evidence that Oregon industrial education students taught by non-degree instructors are generally not receiving inferior instruction compared with those being taught by teachers with a baccalaureate degree.

Order No. 71-14,030, 104 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Phillips, Thomas, G.
(Last name) (First name) (Middle name)

Exact Title A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV

Degree granted Ed.D., Date 1971 No. of pages in report 536

Granted by University of Missouri-Columbia Columbia, Missouri
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1) To compare experimentally the relative effectiveness of two instructional media--a computer pased display unit and a programmed text booklet--for presenting selected instructional units of a common program for teaching FORTRAN IV;

2) To ascertain whether or not there were relationships among programming aptitude, knowledge of language rules, programming achievement, and attitude.

Source of data and method of study:

A common program for teaching FORTRAN was prepared and presented by the media being tested to 49 University of Missouri-Columbia students who took Computer Since 103 (Fortran programming) during the Fall semester of 1969.

Findings and Conclusions:

Students taught by programmed text booklets made significantly fewer errors shen working with the media than students taught by computer based display units. No significant difference was found between treatment groups with regard to knowledge of lenguage rules, programming achievement, number of programming errore, and attitude.

It was concluded that neither of the two media is superior to the other when they are used for presenting programmed instruction to Computer Science 103 students in regard to knowledge of language rules, ability to solve programming problems, and attitude. However, students taught by programmed text booklets may be expected to make fewer cognitive errors than students taught by computer based display units.

There appears to be a greater degree of relationships among programming aptitude, knowledge of language rules, ability to solve programming probles, and the number of cognitive errore for students taught by programmed text booklets.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Plata, Macimino, _____
(Last name) (First name) (Middle name)

Exact Title A COMPARATIVE STUDY OF THE OCCUPATIONAL ASPIRATIONS AND INTERESTS OF HIGH SCHOOL AGE EMOTIONALLY DISTURBED, VOCATIONAL-TECHNICAL AND REGULAR ACADEMIC STUDENTS

Degree granted Ph.D., Date 1971 No. of pages in report 126

Granted by University of Kansas Lawrence, Kansas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem. School administrators need information about their students for the purpose of developing comprehensive vocational education programs for handicapped youth. The purpose of this study was to compare the levels of occupational interests and aspiration of two groups of secondary male emotionally disturbed students with two groups of normal secondary male students. Additionally the anticipated level of occupational attainment was obtained from teachers and ward personnel for their disturbed students.

Procedures. The following procedures were used in carrying out the study:

(a) *Students.* Four groups of male students were randomly selected from public school populations. One group of students was selected from a regular academic program (Regular Academic Group). A second group was selected from students enrolled in an area vocational school (Vocational-Technical Group). The third and fourth groups were selected from the male students enrolled at a special school for the secondary emotionally disturbed. One group of students was receiving psychiatric treatment in the hospital setting (Institutionalized Emotionally Disturbed Group), while the fourth group of students was non institutionalized and was not enrolled in regular public school programs (Noninstitutionalized Emotionally Disturbed Group).

(b) *Instruments.* The Occupational Interest Survey: OIS (Kuder, 1968) and the Occupational Aspiration Scale: OAS (Haller, 1961) were administered to students of each group. An adapted version of the OAS was administered to teachers and ward personnel.

(c) *Research Design.* A 4 X 2 X 2 multifactor design with fixed effects and with repeated measures was used to analyze the students' scores on levels of occupational aspiration. The Pearson product-moment correlation technique was used to compute the relationship of the students' measured levels of occupational aspiration to the predicted scores on level of occupational attainment by teachers and ward personnel. The .05 level of confidence was selected for rejection of all null hypotheses. The Newman-Keuls technique was used to test differences between means.

Findings. The Regular Academic Group aspired to more prestigious occupational positions than did the other three groups, Vocational-Technical, Institutionalized and Noninstitutionalized Emotionally Disturbed. This group was consistently and significantly higher on all levels of occupational aspiration, realistic and idealistic on the two time dimension periods. The only other significant difference occurred between the Institutionalized and Noninstitutionalized Emotionally Disturbed Groups on the realistic and idealistic levels of occupational aspiration. There were no significant differences between the Vocational-Technical Group and the two disturbed groups on all levels of occupational aspiration. Significant interaction effects were found between the time dimension periods and expression levels (Realistic and idealistic). Nonsignificant interaction effects were found between subject groups and time dimension periods; subject groups and expression levels; or between subject group, time dimension periods and expression levels. The prestige of the occupations representing each group's occupational interests was consistent with the prestige of the occupations representing each group's occupational aspirations.

Significant relationships were found between the students' scores on levels of occupational aspiration and the teachers' scores on predicted levels of occupational attainment for their students. Significant relationships were found between student-ward personnel responses on the same variables. Nonsignificant differences were found between the correlation coefficients of student-teacher responses and the correlation coefficients of student-ward personnel responses.

Conclusions. (1) The occupational aspirations of the Institutionalized and Noninstitutionalized Emotionally Disturbed Groups are just as realistic as the occupational aspirations of the normal groups if one considers the Vocational-Technical Group as normal, and if one consideres the predicted manpower needs.

Furthermore, two other facts support this conclusion: (a) only those individuals who can "face reality" are recommended to attend school by the psychiatric personnel and (b) the students' aspirations are in tune with the predicted level of occupational attainment by teachers and ward personnel for their students. (2) The OIS and/or the OAS are instruments which may be used by educators and other vocational personnel for the purpose of counseling high school youth who are job bound.

Order No. 72-11,790, 126 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Podvia (Last name), M. (First name), Wayne (Middle name)

Exact Title THE COMPARATIVE EFFECTS OF BASIC EDUCATION IN MANPOWER TRAINING

Degree granted Ed.D., Date 1972 No. of pages in report 56

Granted by The Pennsylvania State University (Name of institution) University Park, Pennsylvania (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The analysis of differences and releveant outcomes for trainees receiveing basic eduction and occupational training (group A) and those receiving occupational training only (group B).

Source of data and method of study

The Metropolitan Intermediate Reading and Arithmetic Test; the Instruction Attitude Inventory was administered to 55 trainees at the John F. Kennedy Vocational Education Skill Center in Philadelphia, Pennsylvania.

Analysis of the data included "t" test and determination of significant differences between the two groups.

Findings and Conclusions:

The instruments used in this study were chosen for the specific purpose of evaluating the relevant outcomes of trainees receiveing basic education and occupational training and trainees receiving occupational training only. Results indicated that there were no significant differences between the two groups in regard to age and education level. The independent T test revealed that the treatment groups were similar with respect to entry-level scores and the variances.
The lack of difference between the groups may not have been because of the treatment (X) but rather because of characteristics of the trainees in the two groups.
The ineffectiveness of the teaching methods used with group A may have been the reason for the lack of differences.
The trainees may have felt it was harder for them to take part in basic education classes.
MDTA rating scale results did not identify any difference between the two groups.
This research indicates that the trainees were of equal educational level, that the groups were randomly distributed, and that the total group was homogeneous.
Findings indicate that the trainees were as confident at the beginning of the program as at the end.
The results obtained on the IAI did not identify any difference between the two groups on the basis of the variables.
The lack of difference in groups is not due to instrumentation, since there was no changes in the calibration of the measuring instruments nor in the observers or scores.
It can be concluded that, for this study, the occupational teachers, the observer, and the tests did not cause the lack of difference.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author POLETTE (Last name), DOUGLAS (First name), LEE (Middle name)

Exact Title A Conparative Study of Teacher Education Institutions and Machine Tool Manufacturers to Determine Course Content for a Machine Tool Maintenance Course in the Woodworking Area

Degree granted Ed D, Date 1972 No. of pages in report 191

Granted by University of Northern Colorado, Greeley Colorado
(Name of institution) (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

The primary purpose of this study was to determine what type of maintenance training the prospective industrial arts teacher should receive in the woodworking area and the most desireable method of instruction to use to provide this information.

Source of data and method of study·

A survey of literature provided the material necessary to determine the extent and background of maintenance instruction in the industrial arts field. With this information two questionnaires were constructed. One of which was sent to manufacturers of the woodworking equipment and the other to teacher educators. An analysis of the returned data provided the information for the recommendation of content in the area of power woodworking machine maintenance, methods of presenting maintenance information, maintenance responsibility, records, condition of equipment and maintenance budgets.

Findings and Conclusions:

The findings indicate that there is strong agreement between industry and educators on the necessity of presenting information on maintenance items that deal specifically with the correct operation of safety items on the machine as well as the correct adjustment and alignment procedures for each machine. Disagreement was found to exist between the two groups on those items that dealt specifically with the sharpening of the cutting tool for each machine. In this case educators generally placed more importance on this item than did industry.

The majority of educators agree that maintenance instruction is a very important part of the total instruction that a future industrial arts teacher should be given. There was also strong agreement indication that the instructor is ultimately responsible for maintenance of the equipment in his shop facilities.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Potter (Last name), Denis (First name), Arthur (Middle name)

Exact Title A COMPARISON OF SELECTED INTERESTS AND DEMANDS OF PARENTS, TEACHERS, COUNSELORS, AND ADMINISTRATORS AS THEY RELATE TO THE ROLE OF CAREER EDUCATION IN GRADES K - 12 IN THE WEBER COUNTY SCHOOL DISTRICT

Degree granted Ed.D., Date 1973 No. of pages in report 129

Granted by Utah State University (Name of institution) Logan, Utah (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

The purpose of this study was to receive information from various segments of the society which are concerned with the outcomes of the Weber County districts schools. More specifically, this study was concerned with identifying, comparing and analyzing the expectancies of parents, counselors, teachers, and administrators as this information related to career education.

Source of Data and Method of Study:

Data was collected from persons directly involved or associated with the Weber County school district. The sample received a Likert type questionnaire developed specifically for the study. Comparisons were made between eleven groups concerning (1) the need for career education, (2) the role of the school as it related to career education, (3) the responsibility of different grade levels relating to career education, and (4) the perceptions of students concerning career education as these perceptions related to the demands and interests of parents, teachers, counselors and administrators.

Findings and Conclusions:

The data obtained from the instruments disclosed that career education could expect support as a requirement by thos e segments of society questioned. Responses indicated that career education should include skill development and job orientation however they did not support the concept of the school providing a placement service. Indications that career education should be provided in elementary school, but not before the third grade, were made. Uncertainty was wxpressed about the need for more emphasis on career education at the elemantary level, but the need for more emphasis at both the junior high and senior high school was expressed.

Students indicated that some type of career education was experienced by all students, but were uncertain about being provided enough invormation so an understanding of technology and methods to solve needs could be developed. Students want a greater variety and more depth in skill development. They also indicated they did not feel informed about specific skills and duties required by various jobs and that this information would help in making decisions about what to take in high school.

The major conclusions reached as a result of the analysis of data include: (1) career education is generally supported by the society quiestionned; (2) the school should provide for skill development and job orientation; (3) an increase in the emphasis on career education at various grade levels is needed; and (4) students support the need for career education, but presently ar not able to profit from it to the extent that is necessary.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Prater (Last name), Robert (First name), L. (Middle name)

Exact Title EMPLOYMENT OPPORTUNITIES AND TRAINING NEEDS FOR TECHNICIANS IN THE STATE OF MISSOURI WITH PROJECTIONS THROUGH 1970

Degree granted Ed.D., Date 1962 No. of pages in report 210

Granted by University of Missouri-Columbia, (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To compare the probable supply of, and demand for, technicians in Missouri from 1960 through 1970, and to interpret the implications of these findings for the State's program of vocational-technical education.

Source of data and method of study:

Data for the study were obtained from: The Missouri Division of Employment Security; National Science Foundation; Bureau of Census; Department of Labor; Missouri State Department of Education; American Medical Association; and information forms sent to a sample of industrial firms in the State.

Employment opportunities for industrial technicians were estimated as a ratio of the number of scientists and engineers, which was, in turn, obtained by a percentage of total employment in the industries covered by the study. Employment opportunities for health service technicians, and training opportunities for technicians were ascertained by applying the per cent changes in employment and enrollments during the 1950-1960 period to the 1960-1970 period.

Findings and Conclusions:

1. Employment opportunities for technicians in Missouri may be expected to continue at a high level throughout the decade.
2. In-service technical training is needed in most of Missouri's industries.
3. The imbalance between pre-employment technical training programs and the technical occupations foun in the State is sufficient to warrant considerable expansion of the technical curriculums in the public school of the State.
4. Since sizeable percentage of the employers in the State employ formally trained technicians, it seems reasonable to conclude that graduates of technical programs will have little difficulty finding jobs.
5. The number of employment opportunities for industrial technicians may be expected to exceed the number estimated in this study if industrial employers in the State discontinue using their professional personnel in a technician capacity.
6. Since the expected training opportunities for industrial technicians are based on the assumption that now programs will be started each year in the decade, there is a need to begin the training of teachers of technical occupations.
7. Vocational-technical educators and school administrators face a real challenge from industry to accept the responsibility of assuring an adequate supply of technically trained workers.
8. The imbalace between training opportunities and employment opportunities for health service technicians could be corrected, in part, by establishing some of the prescribed short-term pre-employment training programs in the public schools.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Puffer (Last name), Karel (First name), _____ (Middle name)

Exact Title A STUDY OF STUDENT CHARACTERISTICS AT A POST-SECONDARY INSTITUTE OF TECHNOLOGY

Degree granted Ed.D., Date 1971 No. of pages in report 170

Granted by University of Illinois (Name of institution), Urbana-Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The knowledge of student characteristics at a post secondary institute of technology allows for improved curricula, the development of more relevant programs, better admissions policies, and more effective counselling. There is at the present time a lack of systematic data on the characteristics of students at post secondary technical institutes. The purpose of the study was:

a) to establish the most important characteristics of technical students;
b) to compare important characteristics of stayins and dropouts;
c) to develop a procedure for the study of student characteristics which may be used at other institutes;
d) to develop a predictive instrument for the early identification of potential dropouts.

The population of the study was defined as approximately 2,150 students enrolled in, or formerly enrolled in, two year programs in engineering, industrial and business technologies at the Northern Alberta Institute of Technology (NAIT) situated in Edmonton, Alberta, Canada, during the 1969-1970 academic year. Stratified random samples of 138 freshmen stayings, 168 seniors and 106 freshmen dropouts were used in the study. The major data collection instrument was a specially prepared questionnaire. Entrance application forms and the scores on ability tests provided additional data. The analysis of data included distribution statistics, frequency tabulation, analysis of variance, chi-square analysis, correlation and discriminant analysis.

The majority of students attending NAIT came from families having lower socioeconomic status based on father's occupation, education, and income. Although the majority of students came from urban families, urban students were less likely than rural students to persevere in their studies. Similarly, although the majority of students had attended large urban high schools, a larger proportion of the students from small rural high schools persevered in their studies. Dropouts received significantly lower grade point averages at the end of the first quarter than did the stayins. The peer group, instructors and counsellors all had relatively little influence on dropping out.

The discriminant function analysis was used to find the variables which best identified the dropout group. These were: respondent's attitude toward high school, importance of parents's opinion that he attend NAIT, and the interest of the respondent in education in general. The following variables best identified the staying group: his estimated chance of graduating, how disappointed he would be if he did not graduate, and how much he thought success at NAIT depends on study and hard work.

A procedure was proposed for the study of the characteristics of technical students and for the identification of potential dropouts. Questionnaires were presented which may be used by other technical institutes to conduct initial studies on their students' characteristics. Appropriate data should include information on the student's family, community of origin, high school, personal factors, academic achievement, performance on ability tests, and the student's perception of the institutional atmosphere. Appropriate procedures for the analysis of data were also presented.

Implications and recommendations were discussed and additional areas for research were identified.

Order No. 72-12,346, 170 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Ramp (Last name), Wayne (First name), S. (Middle name)

Exact Title THE VOCATIONAL MACHINE SHOP PROGRAM IN ILLINOIS: A FOLLOW-UP STUDY OF GRADUATES AND EMPLOYERS

Degree granted Ed.D., Date 1956 No. of pages in report 227

Granted by Bradley University (Name of institution), Peoria, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study attempted to discover the extent to which the vocational machine shop program in the state of Illinois had been successful in meeting its stated objectives. Secondary problems involved an attempt to discover: (1) which objectives of the vocational machine shop program had the most value in the opinion of the graduates of this program, (2) employers' attitudes and opinions pertaining to the vocational machine shop program and its graduates, (3) the possible need for strengthening the vocational machine shop program in certain areas.

Data were obtained from a survey of former vocational machine shop students who graduated from thirty-five schools in downstate Illinois in the years 1952, 1953, and 1954. Further information was solicited from employers of the graduate respondents.

Questionnaire forms were designed to elicit responses indicating the degree to which graduates and their employers felt vocational machine shop training had been of value. Included in both the graduate and employer questionnaire forms was a check list of forty-eight items directly related to the official stated objectives of the vocational machine shop program in the state of Illinois. These items referred to skills, knowledge, and character traits. Graduates indicated which of these attributes they considered to have been of much value, while employers rated graduates under their supervision either "weak," "strong" or "no opportunity for observation in this respect."

Contact was made with 840 graduates and 439 employers by mailed questionnaire. This resulted in usable returns from 480 graduates and 249 employers for a response of 57.1 percent and 56.5 percent respectively.

Data from returned questionnaires were tabulated in one of five categories according to the type of occupation in which the graduate was currently engaged. These groups were (1) working in the machinist trade, (2) working at some occupation other than the machinist trade, (3) employed in military service, (4) attending college or trade school, and (5) unemployed.

It was concluded that the objectives which had been reasonably well achieved pertained to (1) machine shop skills, (2) knowledge of basic processes, (3) desirable social and moral qualities, (4) craftsmanlike attitudes, and (5) safety. It appeared that the objectives applied to (1) correlation of academic subjects and machine shop training, (2) knowledge of interrelationships of crafts, (3) economics, (4) placement and follow-up activities of the school, (5) information of further training opportunities, (6) employer-employee relationship (7) state and federal agencies, and (8) labor laws probably had not been sufficiently attained.

Objectives which apparently had the most value for the graduate respondents were those which involved (1) safety, (2) skills, habits and attitudes, (3) character development, (4) basic mechanical principles and processes, and (5) related information dealing with the conventional "three R's."

There seemed to be evidence indicating that most graduates and their employers were well satisfied with the vocational machine shop program, irrespective of whether the graduate was working in the machinist trade.

Recommendations, based on the findings and conclusions, concerned such matters as (1) current status of vocational machine shop program, (2) reappraisal of objectives, (3) school-industry contacts, (4) criteria by which the success of a vocational machine shop program may be evaluated, (5) expansion of the program, (6) supplementary (education), and (7) suggestions for further study.

227 pages. $2.95. Mic[illegible]

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Randolph (Last name), James (First name), R. (Middle name)

Exact Title COMPUTER-BASED OCCUPATIONAL SIMULATION FOR NINTH GRADE STUDENTS

Degree granted Ph.D., Date 1972 No. of pages in report 133

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To compare the (1) cognitive achievement, (2) attitude,(3) occupational avareness and (4) occupational interest of students exposed to two different computer-based approaches to the presentation of occupational information.

Source of data and method of study:

This investigation was conducted as an experimental comparison of two computer-based methods of presenting information about the occupation of computer programmmer. The methods utilized were: (1) Non-simulation, a presentation where the student received the occupational information written in essay form and (2) Simulation, a presentation where the computer led the student through the simulation of three life stages of an individual who pursues and enters the occupation.

Findings and Conclusions:

1. That a simulation approach which attempts to involve the students in various aspects of an occupation is more effective in helping them learn cognitive elements of the occupation and gain a perception of themselves in relation to the occupation than a non-simulation approach which does cont attempt to involve the students.
2. That a relationship existes between the two treatments, the socioeconomic status of the students, and their attitude towar the occupation.
3. That students from lower socioeconomic levels who experience the simulation treatment can be expected to exhibit a significantly more favorable attitude toward an occupation than when they experience the non-simulation treatment.
4. That students from middle and upper socioeconomic levels can be expected to comprehend more of the cognitive elements of an occupation thn lower socioeconomic students regardless of the method of presentation.
5. That the method of presentation is indépendent of socioeconomic status.
6, That students' socioeconomic status is not related to their attitude toward the occupation on their perception of themselves in relation to the occupation.
7. That the treatments had no differential effect on the occupational interest of the students.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Raphael (Last name), Michael (First name), A. (Middle name)

Exact Title THE EFFECTS OF PRINTED, AUDIO AND TV PRESENTATIONS ON THE LEARNING OF THREE INDUSTRIALLY RELATED TASKS: AN INVESTIGATION OF THE CUE SUMMATION PRINCIPLE

Degree granted Ph.D., Date 1971 No. of pages in report 113

Granted by University of Akron (Name of institution) Akron, Ohio (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

This study investigated the cue summation concept on the application of learned principles and rules to meaningful task performance, utilizing the effects of various training methods. The principles of clerical filing, deductive reasoning, and assembly of a hypothetical electrical circuit pattern were presented by a video tape, audio taped recording, and a text version of the same material. Ninety vocationally-oriented and ninety General College male students, divided into non-overlapping high and low aptitude groups based on ACT scores, served as subjects. No significant differences were obtained among the training method means, at the .05 level, for performance on either the clerical or deductive reasoning tasks. For performance on the assembly task the video tape mean was significantly superior, at the .05 level, to the audio and text means. The high aptitude group performed significantly superior to the low aptitude group, at the .05 level, only for the deductive reasoning task. It was tentatively concluded that the cue summation concept is not a universally applicable principle since this effect was noted only for a task involving visualization. The results were discussed in terms of future research.

Order No. 72-12,650, 113 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Rapp (Last name), Alfred (First name), V. (Middle name)

Exact Title THE FEASIBILITY OF A DIAGNOSTIC MEDIA TEST SYSTEM MODEL

Degree granted Ed.D., Date 1972 No. of pages in report 211

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To determine the feasibility of the diagnostic test system proposed in the study in terms of ability to: 1) produce learning style profiles; 2) function at different grade levels and with different media; 3) serve as a model.

Source of data and method of study:

The system as proposed was implemented with two distinct populations and with a variation of one media form. The results of this were two tests. These tests were given to the two populations and then validated in accordance with the system.

Findings and Conclusions:

The correlation between the main phase of the test and the corresponding validation phase was +0.92 for the University students and +0.88 for the sixth grade students.

As a result of this study and the data obtained, the following conclusions were drawn:

1) The system is a feasible model capable of predicting individual learning style profiles in terms of the ranked effectiveness of the media covered by the test developed in accordance with the system.

2) This system can be reapplied to construct new tests for other media forms and other academic levels which are equal (having met the minimum correlation requirement) in their effectiveness for providing individual student media learning style profiles.

3) Each teaching sequence remains equally valid as a diagnostic element regardless of its position in the administrative sequence.

4) Either the test used did not develop sufficient discrimination or , for man individuals there is very little difference between effectiveness of some media forms.

5) Teachers who have taken one or two basic media courses should have the background necessary to produce a media diagnostic test which utilizes basic media forms.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE &NAITTE

Author Reed (Last name), Howard (First name), Odin (Middle name)

Exact Title EVALUATION OF INDUSTRIAL ARTS IN SECONDARY SCHOOL OF ILLINOIS

Degree granted Ed.D., Date 1948 No. of pages in report 256

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

A survey of the methods and devices used and the facilities for effective shop and drawing instruction in fifty school in Illinois

Source of data and method of study:

The rating scale which constituted the first part of this study was prepared by compiling from the industrial arts literature rather extensive lists of objective, methods and devices, and physical facilities. These lists were formulated into check-lists which were mailed to one hundred eighty-five prospective jurors who had been nominated for this word by their state directors of industrial education. The second part of this study consisted of a examination of fity public school systems in Illinois. Data were collected from the 50 school systems by interviewing one hundred sixteen teachers with respect to their objectives and teaching methods and devices for industrial arts and by inspecting forty-three drawing rooms and one hundred six shop which were located in 65 different school buildings.

Findings and Conclusions:

On the whole this study seems to indicate that the industrial arts teachers of Illinois have objectives which are generally accepted for industrial arts instruction; however they do not use as many methods and devices to attain their objectives as they should. This study also indicates that the physical facilities of may Illinois schools are non-existent or seriously inadequate. It is suggested that public-school teachers and administrators who are responsible for industrial arts instruction in the secondary schools of Illinois attempt to provide and inprove the physical facilities needed in their industrial arts departments.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Reeser (Last name), George (First name), William (Middle name)

Exact Title THE RELATIVE EFFECTIVENESS OF SELECTED INSTRUCTIONAL MEDIA FOR STIMULATING STUDENT AWARENESS OF AND INTERSET IN THE CONSTRUCTION INDUSTRY

Degree granted Ph.D., Date 1971 No. of pages in report 219

Granted by The Ohio State University (Name of institution) Columbus, Ohio (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The basic purpose of this study was to assess the effectiveness of various teaching methods in presenting occupational information to junior high school students.

Two objectives were developed to accomplish the above stated purpose and to give specific direction to the study. They are:

Objective 1: To determine whether selected media had a positive and differential effect upon student *awareness* of occupations in the construction industry.

Objective 2: To determine whether selected media had a positive and differential effect upon student *interest* in the construction industry.

The literature was reviewed to identify techniques and instruments used to measure awareness of and interest in the construction industry. As a result of the review of literature, it became evident that little relevant work had been done in the area.

Three methods of instruction were used in disseminating information about construction occupations to eighty-seven junior high school students. A fourth group of twenty-nine students was used as a control group. The methods of instruction for the three, forty-minute presentations were: (1) coordinated-slide-tape, (2) independent readings of booklets, and (3) teacher-lecture.

The research design used in this study was a modified version of Campbell and Stanley design 10 (Non-equivalent Control Groups) without randomization. Two variables on each student were analyzed to determine the relevant group similarities. These were: (1) Iowa Basic Skills Test (Reading scores), and (2) Iowa Basic Skills Test (Total Academic Scores). These were analyzed by means of one-way analysis of variance.

Two instruments were utilized to assess the effectiveness of the three presentation methods. These were an already-developed Construction Industry Interest Inventory (CIII) and an investigator-constructed Construction Industry Achievement Test (CIAT). The Achievement test was a fifty-item, four-choice, multiple choice achievement test.

The analysis of data of selected media indicates a positive and differential effect upon student achievement in occupational knowledge of the construction industry. Students who were taught by the coordinated slide-tape method of instruction made significant achievement gains. The students who were taught by the individual booklet and teacher-lecture methods made achievement gains but they were not significant.

The analysis of the data indicates that selected media, in the manner in which each of several were used in this study, does not have a positive and differential effect upon student interest in the construction industry. The coordinated slide-tape method resulted in a larger overall increase in student interest than did the individual booklets or teacher-lecture methods. The increases were not statistically significant.

Recommendations to researchers are:

1. Additional research should be conducted to determine retention phenomena with regard to occupational information.
2. Further variations of presentation methods and length of treatment units should be studied in order to determine the most efficient method and duration of treatment for presenting occupational information to junior high school students.
3. Additional research should be conducted to determine readiness for occupational orientation learning in adolescents.

Recommendation to practicing educators are:

1. Revise the instructional materials used in this study in order to increase student awareness of and interest in the construction industry.
2. Program time should not be made available to develop occupational interest through the use of methods and materials similar to those used in this study.
3. The coordinated slide-tape method of instruction should be given preference over the use of individualized study booklets or lecturing, in attempting to teach occupational information under conditions similar to those found in this study.

Order No. 72-15,278, 219 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Reid (Last name), Dempsey (First name), Ellis (Middle name)

Exact Title AN ANALYSIS OF THE UNDERGRADUATE TRAINING PROGRAM FOR INDUSTRIAL ARTS TEACHERS IN FOUR SELECTED ILLINOIS TEACHER TRAINING INSTITUTIONS

Degree granted Ed.D., Date 1956 No. of pages in report 135

Granted by Bradley University (Name of institution) Peoria, Illinois (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to survey the industrial ... teachers who have graduated during the past five ...rs from one of the four selected Illinois teacher-...ing institutions, analyze their training, and isolate ap-...nt weaknesses in their educational background. The ...ers were sent a questionnaire which was designed to ...n factual data as to the type of training the teacher re-...d while in college, the types of shops in which they ... taught, the subject areas they have taught, and other ...mation regarding their teaching experiences. Also in-...d in the questionnaire were questions that gave the ...ers an opportunity to evaluate their college training ... express opinions and recommendations for the train-... future industrial arts teachers.

The findings were tabulated according to the individual ...ls and not as a total group. No comparison was made ... training programs of the colleges except where the ...es could be evaluated in terms of comparative cur-...ar offerings of the schools.

The supervisors from the State Board of Vocational ...tion of the State of Illinois were also asked to express ...ns and recommendations as to the general effective-... the college training programs. Their replies were ...n combination with the teachers' replies as a basis ...neral conclusions and recommendations.

The summary of this study includes recommendations ...h of the four participating colleges as to course ... course requirements, general college require-... and the administrative planning for the industrial ...partments. The recommendations were made on ...is of the teachers' replies and in comparison with the programs being offered at the present time by the colleges. The summary also includes general recommendations that might well apply to all colleges that offer an industrial arts teacher-training program.

135 pages. $1.80. Mic 56-3330

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Relyea (Last name), Gladys (First name), Mildred (Middle name)

Exact Title THE CLINICAL LABORATORY TECHNICIAN: AN OCCUPATIONAL ANALYSIS

Degree granted Ed.D., Date 1937 No. of pages in report 166

Granted by Stanford University (Name of institution) Stanford, California (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

An analysis of the occupation of laboratory technician to provide information for those considering entrance in the occupation. It aims to aid in counseling and guidance work also.

Source of data and method of study:

Information was used which came from technicians in the upper ranks only. Completed questionnaires received from 47 technicians in California laboratories. Completed questionnaires received from 170 technicians in laboratories in all sections of the United States. Partially completed questionnaires, and letters, from about 50 technicians in the United States. Information on the high-school careers of about 100 technicians received from their high-school officers. Ratings on Personal Traits Needed by Technicians as received from the directors of 25 training schools for technicians, these schools being approved by the American Society of Clinical Pathologists in 1935. Interviews with technicians and visits to laboratories in California and New England. Books, magazines, and pamphlets dealing with the vocation in the past and the present.

Findings and Conclusions:

The greater number of technicians are women. Most technicians are unmarried. The reasons given by technicians for entering the vocation can be classified under these headings: personal interest in science, family interest in science, lack of the means to go into nedicine, and dislike of nursing and teaching.

A topic of great interest to vocational counselors and their counsellees is that of the theoretical and practical training required for the vocation. Another topic of importance to vocational guidance worker and their students is that of the personal traits required for the vocation.

The number of hours of work per week varies in teh different types of laboratories.

The vocation seems to be in a very healthy condition. It is rapidly increasing in importance to the medical profession and thus to all people. It is definitely setting its course toward higher standards in personnel, technique, and physical conditions in laboratories. It aims to be recognized as a profession.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Rice, Jr. (Last name), Joseph (First name), Alva (Middle name)

Exact Title A DESCRIPTIVE ANALYSIS OF THE OCCUPATIONAL PROGRAMS AT MONTGOMERY COMMUNITY COLLEGE, 1946-1971

Degree granted Ed.D., Date 1971 No. of pages in report 306

Granted by The George Washington University (Name of institution) Washington, D.C. (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Because of the rapid growth of the community college movement, in general, and of the Montgomery Community College, in particular, this researcher believes that pertinent data concerning occupational programs at the College must be recorded and analyzed to insure that their significance to the College and to the community college movement not be lost. Without assessment and evaluation, even a well-executed program can fail to meet its potential. On the basis of the past record, administrators and others charged with structuring the curriculum can make better plans for the College to meet the needs of the community which it serves.

In order to accomplish the aims of this study, the historical development of occupational programs at Montgomery College was traced and the programs presently offered were described and analyzed. The sources of information were limited because documents relating to the formation and growth of certain of the occupational programs at the College have not been kept and, therefore, are unavailable for study.

For the purposes of comparison and analysis, the occupational programs were grouped into four categories—Health Occupations, Trade and Industry Occupations, Business Occupations, and Public Service Occupations. Each category was examined in reference to six aspects of development and growth: type of program, use of community resources, use of community facilities, use of lay advisory committees, enrollment, and employment outlook.

A summary of the findings follows:

1. The Technical and Semi-Professional Survey of 1963 recommended that seven occupational programs be developed. All but one of these have been instituted by the College, but not necessarily in the form recommended.

2. Montgomery College has responded to the needs of the community by offering programs with a dual purpose: to prepare workers and to upgrade the skills of people already engaged in an occupation.

3. The College is utilizing community resources both as consultants and as classrooms for "real world of work" study.

4. Occupational programs are expanding in number and in depth. At present, there are 24 occupational programs being offered; 22 of these have been developed, revised, or updated since 1968.

The following recommendations are offered as a result of this study:

1. that Montgomery College establish archives where the various data pertinent to the history of the development of the college will be kept in a central location;

2. that each department keep records which will lend support and offer rationale for its programs;

3. that a method be devised to determine the extent of knowledge the student brings to a program so that he will not be required to take courses with which he already is sufficiently familiar;

4. that more certificate programs be developed at Montgomery College to meet the needs of students who wish to concentrate in a particular area of study to enhance their marketable skills;

5. that occupational programs be developed with the main consideration being preparation for the development of marketable skills and preparing the student for entrance into the workaday world;

6. that the possibility of conferring degrees other than that of Associate in Arts be explored;

7. that occupational programs be coordinated by a central agent who can focus and build on the common aspects of such programs;

8. that this officer be accorded the rank of Dean;

9. that Montgomery College explore the possibility of creating more cluster-type programs, either by developing new studies or by realigning established programs.

Order No. 72-3742, 306 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Riggs (Last name), Donald (First name), Dean (Middle name)

Exact Title A SEMANTIC DIFFERENTIAL STUDY OF THE ATTITUDE TOWARD OCCUPATIONAL EDUCATION AFTER EXPOSURE TO EXEMPLARY COMCEPTS

Degree granted Ph.D., Date 1971 No. of pages in report 151

Granted by Kansas State University (Name of institution) Pittsburg, Kansas (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary purpose of this study was to ascertain the change in attitude of selected educators toward Occupational Education after being exposed to exemplary concepts. Four hypotheses were used to ascertain the differences in meaning of selected education concepts.

1. There are no significant differences in the attitudes of the control groups and the experimental groups.
2. There is no significant change in selected educators' attitudes toward vocational education after being exposed to exemplary concepts.
3. There is no significant difference in the attitudes of the two experimental groups.
4. There is no significant difference in the attitudes of the two control groups.

The study was limited to two school systems in Kansas, both of which were involved in an exemplary program, over a period of one academic year. It was also limited to the meaning of thirty-six education concepts.

The semantic differential technique used in the study was administered on a pretest, posttest basis to the experimental groups in a class situation and the control group data was gathered by use of the local school mail.

The results of the study showed a definite rearrangement of academic and vocational concepts on the posttest from the rankings on the pretest.

The pretest and posttest both revealed measurable and statistically significant differences in meaning at the .05 level of significance for the vocational concepts within each of the four sample populations and differences in concept meaning between the four sample populations.

The findings of the study suggested that exposure to exemplary concepts through the Occupations Education course by the two experimental groups provided a better understanding of how vocational education could be integrated into the educational setting with academic offerings.

It was concluded that the semantic differential is an effective tool in measuring differences of education concepts and would be a useful tool for administrative use in the academic community to become aware of the differences in meaning of selected concepts.

It is recommended that a critical evaluation be given the instrument for future use in order to shorten it and eliminate some of the unnecessary distractors before being used by administrators and teacher educators as an evaluative tool in ascertaining differences in meaning of certain education concepts.

Order No. 72-17,090, 151 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Riley (Last name), John (First name), N. (Middle name)

Exact Title TESTING THE VALUE OF SILENT SUPER 8mm SINGLE CONCEPT LOOP FILMS AS AN AID TO THE ACQUISITION OF MAIPULATIVE SKILLS IN THE MACHINE TRADES

Degree granted Ed.D., Date 1972 No. of pages in report 105

Granted by Rutgers, The State University of New Jersey (Name of institution), New Brunswick, New Jersey (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To empirically measure silent super 8mm single concept loop films as an aid to learning manipulative skills in a machine shop setting.

Source of data and method of study:

79 first year marine engineering college students were randomly divided into control and experimental groups. The control group received standard lecture-demonstration instruction on the orientation and safe operation of an engine lathe and the use of a micrometer. The experimental group received identical teacher performed lecture-demonstration instruction with the addition of the loop films being shown during and following the lecture-demonstration period and free access to loop films during the repitition - reinforcement period of learning.

The study was a post-test-only control group design. O_2 was teacher only and O was teacher plus films. At the close of the training and exam periods, each student deposited his production in an adjoining laboratory. These units were then counted and evaluated by a laboratory technician according to the standards established for evaluating the product.

Findings and Conclusions:

1. There was no significant difference in the effectiveness of the SSCLF method as measured by acceptable units produced.

2. Differences in favor of teacher plus SSCLF (O_1) were significant at the 0.01 level of confidence in the area of volunteered teacher assistance. Differences in favor of teacher plusSSCLF (O_1) were significant at the 0.05 level of confidence in the combined area of volunteered and requested teacher dependency.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Roberson (Last name), Roy (First name), P. (Middle name)

Exact Title AN EXPERIMENTAL COMPARISON OF TWO METHODS OF TEACHING RELATED INFORMATION IN DISTRIBUTIVE EDUCATION AT THE HIGH SCHOOL LEVEL

Degree granted Ed.D., Date 1967 No. of pages in report 296

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To compare the relative effectiveness of teaching specific related information in distributive education by individual self-instruction with that of teaching by a combination of teacher lectures and class discussions.

Source of data and method of study·

The experimental method was employed to compare the two approaches to teaching specific related information. All relevant conditions, other than the teaching methods, were held as nearly constant as possible so that the relative effectiveness of the lecture-discussion (control) and the individual study (experimental) methods of teaching could by observed and measured.

Eight senior high schll distributive education classes in Missouri, with a total of 187 students, participated in the study. Two different specific related information units of instruction were taught. Five regular school periods were used for teaching each unit. The rotation-group method was employed for alternating the two teaching methods with the two units of instruction. All classes were taught by the researcher.

Findings and Conclusions:

1. The informational gain of students taught by lecture-discussion will not be significantly different from the informational gain of students taught by writteen individual study assignment sheets.
2. The lecture-discussion method requires more time for students to receive instruction than the individual study method does.
3. The initial preparation of materials for teaching by the individual study method requires more timve than to prepare mateials for the lecture-discussions method.
4. When taught by differnt teaching methods, student attitudes toward a unit of instruction may differ.
5. Initial prepartaion costs of materials for teaching by the individual study method will be greater than theat of materials used with lecture-discussion; however, this may be offset somewhat by repeated use.
6. High school distributive education programs need more and betteer specific related information reference and study materials.
7. In order to do an adequate job of teaching and on-the-job supervision, coordinators should not be expected to prepare written individual study materials for all of their students.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Roberts, Jr., Lewis, _____
(Last name) (First name) (Middle name)

Exact Title A STUDY OF VOCATIONAL-TECHNICAL EDUCATION AS PERCEIVED BY ADMINISTRATORS AND INSTRUCTORS IN ALABAMA PUBLIC VOCATIONAL-TECHNICAL INSTITUTES, TRANSFER JUNIOR COLLEGES AND COMPREHENSIVE JUNIOR COLLEGES.

Degree granted Ed.D., Date 1972 No. of pages in report 134

Granted by Auborn University, Auborn, Alabama
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To determine attitudes toward vocational-technical education and to determine if the type of educational institution and instittutional and instructional variables were significant factors in the determination of administrator and instructor attitudes in three selected Alabama public: (a) vocational-technical institutes, (b) transfer junior colleges, and (c) comprehensive junior colleges.

Source of data and method of study:

The study consisted of 322 participants who represented 97% of the administrators and 84% of the instructors employed by the nine institutions. A semantic differential instrument was constructed to determine each participant's attitude towar each of the following six elements of vocational-technical education: administrators, instructors, counselors, students, curriculum and teaching methods.

Findings and Conclusions:

1. All administrative and instructional groupings had a positive attitude toward vocational-technical education.
2. The type of educational institution, the institutional position held factor and instructional postion held factor were significant in the determination of administrator and instructor attitudes toward most elements.
3. The administrators and instructors were quite consistent in their respective attitudes toward vocational-technical education in both the vocational technical institutes and transfer junior colleges, but personnel groupings in the comprehensive junior colleges significantly differed in their respective attitudes.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Robertson, Jr. (Last name), Luther (First name), Paul (Middle name)

Exact Title AN EVALUATION OF THE ELECTROMECHANICAL TECHNOLOGY CURRICULUM AT OKLAHOMA STATE UNIVERSITY

Degree granted Ed.D., Date 1970 No. of pages in report 146

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Scope of Study: The purpose of this study was to document and summarize the curriculum practices in electromechanical technology in the United States in 1970. The content of the EMT curriculum at Oklahoma State University was compared with that of other schools.

Qualifying examinations furnished by a research and development laboratory, a large computer manufacturer, and a modern components manufacturing concern, were used to determine whether the Oklahoma State graduates met the minimum requirements for job entry. Further, the data were examined to reveal any significant differences between OSU graduates and the comparison populations.

Findings and Conclusions: Results of the study indicate that the EMT curriculum at Oklahoma State University when compared with the national averages, had about the same amounts of math and science. There was more emphasis upon the technical EMT courses, but little that could be classified as auxiliary technical courses. Contained within the above-average emphasis upon technical content was an increase in laboratory emphasis. The increase in technical activity resulted in a decrease in general education offerings.

Although some OSU graduates in EMT did not qualify for employment based on the industrial examinations, a creditable number were acceptable. It was found that the differences between the industrial comparison populations and the OSU graduates were not statistically significant. It was also found that the three technical examinations used by the separate industries possessed high rank-order correlations. These technical examinations were mainly electronic in nature and the comparison populations were usually graduates of electronics curriculums. These findings implied that the OSU graduates possessed, in addition to their mechanical knowledge, electronics knowledge which was not significantly different from that possessed by the comparison populations.

Order No. 71-11,264, 146 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Robinson (Last name), Clarence (First name), Leslie (Middle name)

Exact Title A STUDY OF INDUSTIRAL EDUCATION GRADUATES AND NON-GRADUATES OF TEXAS SOUTHERN UNIVERISTY WITH IMPLICATIONS FOR CURRICULUM REVISION

Degree granted Ed.d., Date 1972 No. of pages in report 195

Granted by North Texas State University (Name of institution) Denton, Texas (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem was a study of industrial education graduates and non-graduates of Texas Southern University, with implications for curriculum revision.

The purposes of the study were to obtain information on the professional status, activities, and location of the individuals who graduated from the School of Technology at Texas Southern University, as well as those individuals who withdrew prior to completing their program of study, to provide information relating to the present status and effectiveness of industrial education at Texas Southern University, and to furnish data upon which school authorities at Texas Southern might justify changes in the present educational services.

The content of the study was arranged into five chapters. The first chapter is divided into the following sections: introduction, statement of the problem, purposes of the study, research questions, definition of terms, limitations, and background and significance of the study.

The second chapter is a review of the related literature. Major areas reviewed were literature relating to industrial arts teacher education programs, literature relating to industrial technology programs, and literature relating to industrial technology and industrial arts teacher education programs. The third chapter is divided into the following sections: methods and procedures, a description of the instrument, procedure for collecting data, personal interviews, and procedure for treating data. The fourth chapter contains data presented in tabular form. Chapter V includes a summary of the study and presents the findings, conclusions, and recommendations.

The data were obtained by questionnaires sent to graduates and non-graduates of the School of Technology at Texas Southern University during the past ten years, 1960–70, and personal interviews with twenty-nine graduates and sixteen non-graduates within a 300-mile radius of Houston.

The questionnaire requested information concerning three basic categories of data: (1) personal and background information, (2) occupational information, and (3) analysis of curriculum effectiveness (evaluation of courses in industrial education at Texas Southern University). Responses were received from 112, or 46.8 per cent, of the 177 graduates contacted, and 68, or 46.8 per cent of the 145 non-graduates contacted. Data on the location of the graduates and non-graduates and years in which they graduated or withdrew were secured from the records of the graduates and non-graduates, as found in the files of the School of Technology at Texas Southern University.

The results of personal interviews, questionnaire responses by graduates and non-graduates concerning the industrial education program at Texas Southern University were tabulated, and the results were expressed in numbers and percentages.

As a result of the study, it was concluded that the industrial education program at Texas Southern University is in need of revision and upgrading with regard to some course offerings and equipment.

Based upon the findings and conclusions, it was recommended that a careful study of the overall program be made, carefully weigh all recommendations and implement them to the degree feasible and appropriate.

Order No. 72-24,202, 195 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Robinson (Last name), Clark (First name), Norval (Middle name)

Exact Title A METHOD FOR OBTAINING OCCUPATIONAL INFORMATION OF VALUE TO THE SCHOOL

Degree granted Ed.D. Date 1947 No. of pages in report 114

Granted by Stanford University (Name of institution) Stanford, California (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

A study showing method of obtaining employment information from occupation-centered and industry-centered data.

Source of data and method of study:

This study provides a method whereby occupation-centered data and industry-centered data may be synthesized to obtain this composite occupational-industrial picture of current employment. The setting of the study is the city of San Francisco and the state of California. Through use of Census data, an occupational distribution pattern for each industry was derived, in order that the current Department of Employment figures might be broken into their occupational components.

Findings and Conclusions:

The occupation-industry ratios are presented in composite tables. The numerical table presents the industrial distribution of 70 occupations and the occupational distribution of 60 industries.

The purpose of this study is not the presentation of employment data, but rather the development of a method by which current quantitative occupational-industrial information can be obtained. All teachers, then, should have some knowledge of vocation and its place in our culture. Those engaged in guidance, vocational training, of placement activities must have a much broader and more complete understanding of work and workers. They will find an extensive study of these data to be of help in achieveing and maintaining professional competency.

There is some question as to the extent to which the school realizes the importance of information in the planning of sound guidance, training, and placement programs.

Only one phase of the school's problem was considered in this study--its need for quantitative employment information.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Robinson (Last name), Mendel (First name), Leno (Middle name)

Exact Title AN ANALYSIS OF THE UNIQUE NEED FOR AND PROBLEMS IMPINGING UPON THE OFFERING OF A COMPLETE PROGRAM OF OCCUPATIONAL EDUCATION IN TEXTILES IN THE STATE OF NORTH CAROLINA

Degree granted Ed.D., Date 1970 No. of pages in report 135

Granted by North Carolina State University (Name of institution) Raleigh, North Carolina (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to present more evidence to encourage the current and future leaders of the textile industry and of occupational education programs to remain cognizant of the importance of the textile industry to the people and Government of North Carolina. Further objectives were to demonstrate that a unique need for a complete program of occupational education in textiles existed in North Carolina, that the need was not yet being fully met, and why it was not being met.

A detailed demographic characterization of the relative concentrations of population, nonagricultural employment, manufacturing employment, and textile industry employment was presented for the State of North Carolina in 1968. Comparisons of employment and wages paid in the leading manufacturing groups in North Carolina from 1960 to 1968 were included, along with a survey of the composition of the civilian labor force for this period. In addition, the comparative contributions of the textile industry and that of agriculture to the fiscal functionings of the Government of North Carolina were included to illustrate their relative importance to the state.

Results indicated that population, nonagricultural employment, manufacturing employment, and textile industry employment were concentrated in the Piedmont Subregion. The textile industry was shown to be overwhelmingly predominant in both employment and wages paid over the other manufacturing groups within North Carolina. The decline in agricultural employment and the rise in nonagricultural employment was demonstrated and the textile industry was shown to be an extremely lucrative tax asset to the State of North Carolina.

A characterization of textile occupational education was developed covering the continuum of public educational institutions from the secondary school level through the university level. Germane data were supplied in support of a premise that in view of the importance of the textile industry to the people and the State of North Carolina, progress had only begun, except at the university level, in offering occupational education programs in textiles.

An iconoclastic view of the major problems that interacted to promote the conditions demonstrated was presented. It was shown that the effects of these problems must be mitigated if progress was to be stimulated in textile oriented occupational education in North Carolina and suggestions regarding what might be done were made.

Order No. 71-12,538, 135 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Robinson (Last name), Orin (First name), Ray (Middle name)

Exact Title NON-TEACHING GRADUATES OF THE FOUR-YEAR STATE COLLEGE: PROGRAMS OF PREPARATION, PLACEMENT, JOB SUCCESS, AND JOB SATISFACTION

Degree granted Ed.D., Date 1965 No. of pages in report 248

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To ascertain the trends in the preparation of non-teaching graduates by selected four-year state colleges in the Midwest and further to ascertain the placement, job success, and job satisfaction of the non=teaching graduates from Southwest Missouri State College.

Source of data and method of study:

Twenty-five four-year state colleges from eight Midwest states provided information for the first phase of the study. In the second phase of the study, 508 non-teaching graduates completed job satisfaction scales and provided personal information about themselves and their jobs. Correlation tests were performed between 12 predictor variables and three criterion variables relating to the graduates' job success and job satisfaction.

Findings and Conclusions:

1. A majority of the increase in the four-year state college enrollment of the immediate future will be non-teaching majors.

2. Because of its location and accessibility, the four-year state college often has a large number of students from small adjacent communities and rural areas. The broader and more flexible the program offered by the college the better its capabilities are for uniting the non-teaching graduates with many different areas of service which are likely to be located in the larger metropolitan areas.

3. There appear to be identifiable background factors and personal characteristics which predict to some degree the job success and job satisfaction that accrue to the non-teaching graduate.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Boeder (Last name), John (First name), Anthony (Middle name)

Exact Title AN ANALYSIS OF COOPERATIVE VOCATIONAL TECHNICAL TEACHER EDUCATION CURRICULUM AND PROGRAMS

Degree granted E.d. D., Date 1972 No. of pages in report 155

Granted by State University of New York (Name of institution) Buffalo, New York (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to investigate and derive answers to specific questions related to the nature of cooperative teacher education programs at United States colleges and universities offering vocational technical education programs, and to determine their characteristics with implications for the selection and education of vocational - technical teachers.

The study was concerned with programs offering concurrent work experience and academic study in their cooperative vocational technical teacher education curriculum.

The National Association of Industrial Teacher Educator Directory (1969-70) and the Cooperative Education Association Directory (1970) were used to identify 133 university programs. Sixty-nine of the 133 university personnel contacted responded. Twenty-nine indicated they had some form of a cooperative education program. Thirteen higher education programs were accepted as having the criteria established for this study.

The researcher used the descriptive survey method. The data was collected from two sources: informational data from thirteen college and university personnel in charge of cooperative programs; and a two-part questionnaire distributed to faculty students and employers.

The two-part questionnaire was the outcome of a pilot questionnaire distributed to selected personnel for purposes of critique and analysis. The questionnaire data was collected from thirty-four faculty, eighty-seven students, and forty-two employers associated with cooperative programs at the thirteen higher education institutions.

The results and conclusions follow:

1. A composite chart summarized the program characteristics of the thirteen higher education institutions offering concurrent work experience and academic study. A second composite chart summarizes samples of program characteristics of university programs not included in the study.
2. Completion of a degree required variant degrees of cooperative work experience with an industrial employer. This experience ranged from six months to three years.
3. Students and employers did not participate in the many functions suggested by the questionnaire as often as they felt they should have participated. The sum of the mean analysis supported the supposition that participation by student and employers was limited.
4. The faculty controlled all aspects of the curriculum.
5. Seventy-two per cent of the employers felt they should have participated in selecting students for the co-op program.
6. Students and employers never participated in the faculty recruitment.
7. Overall plans for cooperative programs seem limited by individual university governing requirements.
8. The faculty administered the programs and agreed they should administer it. However, students and employers felt they should have some responsibility for administration.
9. The respondents agreed that the university should meet the needs of students for their teaching situation as well as offer college credit for the cooperative program experiences.
10. The respondents agreed that co-op programs should: integrate theory and practice in an occupational area, be especially well-equipped to prepare students for the new emerging technology, have supervised work experience, have diversified occupational experiences, have performance skill competencies, and have multiple and different experience for knowledgeability about the occupation.
11. Thirty-five per cent of the employers questioned the need for a partnership as well as a need for a continuing dialogue among faculty, students and employers.

It was recommended that:

1. Attention must be given to open lines of communication among faculty, students and employers for the purposes of educational decisions and policies which affect students and employers in the total structure of a co-op program.
2. Serious studies should be made on the cost factor of operating a cooperative program at the industrial, vocational, technical teacher education level.

Order No. 72-15,631, 155 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Rummell, Winfield, Raymond
(Last name) (First name) (Middle name)

Exact Title AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES

Degree granted Ed.D., Date 1971 No. of pages in report 205

Granted by Arizona State University, Tempe, Arizona
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The potential value of low cost simulation as an effective instructional technique was the issue about which the study was concerned. Numerical control was the subject chosen to be used as the vehicle for investigating this issue.

The study sought to answer the following specific questions:

1. Can students achieve a basic knowledge of numerical control as well when taught with numerical control simulators as when taught with numerically controlled equipment?
2. Can students demonstrate their proficiency at numerical control part programming as well when taught with numerical control simulators as when taught with numerically controlled equipment?
3. Does the fact that students were exposed to numerical control through simulation techniques affect their attitude toward numerical control differently than students taught with numerically controlled equipment?

The review of the literature on instructional simulation revealed a reluctance on the part of industrial educators to take full advantage of the potential power of simulation as an instructional technique. The fact that business, industry, and the military recognizes the effectiveness of simulation and use it extensively was established.

The review of the numerical control literature was directed at identifying numerical control as a newly developed way for man to communicate with machines. The review brought out the general belief among metal technologists that N/C is one of the most important metalworking developments of the century.

The sample used in the experiment consisted of forty-three students at Chico State College who enrolled in ITEC 50, Introductory Metals Processing, during the 1971 spring semester. A stratified randomization technique was used to randomly assign the forty-three students into two groups. The two groups were then randomly assigned to the two treatments.

The research design was a true experimental, two group, posttest-only design.

The criteria instruments developed for the experiment consisted of three measures: (1) *achievement of* the basic principles surrounding N/C, (2) performance in writing an N/C part program, and (3) *attitude inventory* of the student's attitude toward numerical control. A jury of experts and a pilot study were used in analyzing and improving the criteria instruments.

The treatments involved 12-1/2 hours of instruction and laboratory time plus an additional 2-1/2 hours for administering the posttest.

Each of the three hypotheses were tested for significance using the "t" test at the .05 level of confidence. Pearson product-moment correlation coefficients were derived from the achievement and performance test results.

Analysis of the data collected from the administration of the criteria instruments revealed that all three null hypotheses could not be rejected at the .05 level of confidence.

The primary conclusions reached in the study were that:

1. Both simulation and utilization of numerically controlled equipment are equally effective for aiding students enrolled in undergraduate introductory metal processing courses in:
   a. achieving basic knowledge of numerical control.
   b. developing proficiency at writing numerical control part programs.
   c. developing positive attitudes toward numerical control.
2. Regardless of whether the instructional technique is simulation or utilization of numerically controlled equipment, a high positive correlation will exist between achievement of numerical control knowledge and proficiency in writing a numerical control part program for students enrolled in undergraduate introductory metal processing courses.
3. Students exposed to numerical control instructional simulation will develop a positive attitude toward attempting to teach numerical control principles without the availability of N/C equipment while students that utilize numerically controlled equipment will display a negative attitude toward attempting to teach numerical control principles without the availability of N/C equipment.

Order No. 72-3003, 205 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sage, James Ellsworth, _____
(Last name) (First name) (Middle name)

Exact Title A COMPARISON OF THE INQUIRY AND LECTURE METHODS FOR THE ACQUISITION OF KNOWLEDGE RELATIVE TO PROBLEM SOLVING PERFORMANCE

Degree granted Ed.D., Date 1971 No. of pages in report 249

Granted by University of Missouri-Columbia Columbia, Missouri
(Name of institution) (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to compare experimentally the effectiveness of two different instructional approaches (the inquiry method and the lecture method) on the learning of problem solving performance. The study ascertained the effect of the two instructional approaches on selected variables in technical electronics, i.e. (1) checking learning at different points during the experiment, (2) student acquisition of knowledge, (3) student problem solving cognition, (4) student problem solving performance, (5) student problem solving time, and (6) the reaction toward the course after the treatments were presented.

The study was limited to fifty-three students enrolled in three sections of the course titled "Applied Alternating Current" during the second semester of the 1970-1971 school year in the Department of Industrial-Technical Education at Southeast Missouri State College, Cape Girardeau. The length of the experiment was eleven weeks. Two sections were randomly selected to receive the lecture method and one section received the inquiry method. The three sections of students involved in the experiment were taught by an experienced instructor. The researcher acted as a coordinator of the instructional period and supervisor in the laboratory periods. All sections were issued the same instructional materials.

The inquiry method of presenting concepts and principles utilized the instructor as a coordinator of inquiry. Students were furnished general and skill objectives. During student centered discussion periods over objectives, the instructor only responded to questions phrased in a way to receive a "yes," "no," "it depends," or "tell me more." Related and unrelated examples for each objective of the concept or principle were shown and students constructed circuits to solve problems through discovery during the laboratory periods. A set of notes were passed out from a tape recording of the session.

The lecture method of presenting facts for memorization utilized the instructor as a director of classroom activity. A topical outline of the unit was passed out and facts behind each of the concepts and principles were presented. The students got their information by taking individual notes and reading assignments. The students constructed specific circuits to solve problems during the laboratory period. The facts obtained were placed on three by five inch index cards and memorized.

To ascertain group equivalency the two groups were compared on five variables: age, number of electronic courses previously taken, number of college hours completed, scholastic aptitude as determined by the School and College Aptitude Test, and a pretest. No significant difference was found between the means.

The analysis of data yielded a significant difference between the means representing the concepts of alternating current, inductance, capacitance, and the principle of LC filters; problem solving performance; and the number of inquiries made. The results of the analysis were in favor of the inquiry method of instruction. No significant difference was found between the means representing the knowledge test, problem solving cognition test, and problem solving time of the performance test.

In view of the findings and conclusions of this study, the following recommendations appear to be in order:

Teacher education institutions preparing teachers in industrial education should be alerted to the advantages of the inquiry method of instructional for use in their electronic classes.

Teacher educators include in their instructional materials area a technique for developing instructional units for the inquiry method of instruction.

If educators decide to develop a tailor-made in[illegible] approach, a procedure similar to the one outlined in this study may [illegible]lowed.

Order No. 72-19,[illegible], 249 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author SAWYER (Last Name), DAVID (First Name), ERNEST (Middle Name)

Exact Title DIFFERENCES IN VOCATIONAL MATURITY AND SELECTED BEHAVIORAL TENDENCIES BETWEEN PART-TIME COOPERATIVE EDUCATION PARTICIPANTS AND NONPARTICIPANTS IN SELECTED TEXAS SECONDARY SCHOOLS

Degree granted Doctor of Education, Date August, 1972 No. of pages in report 162

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. (X)

Purpose of Study: (1) To evaluate students in selected secondary cooperative education programs in Texas, (2) to base the evaluation on the measurement of selected internal dimensions that can be attributed to participation in such programs, (3) to utilize means other than the traditional collection of subjective responses from participants, supervisory personnel, and employers, and (4) to make recommendations about objective measurement.
Source of data and method of study: A modification of the Solomon Four-group pretest-posttest design was utilized as the primary experimental technique. A random sample of participants in cooperative education programs was matched on IQ, chronological age, sex, grade level, and school attending with two groups of nonparticipants and a second group of participants. One group of participants and one group of nonparticipants were administered pretests of the California Psychological Inventory (CPI) and the Vocational Development Inventory (VDI). After one school year all four groups were administered the instruments.
Findings and Conclusions:

1. Differences in basic personality and behavioral tendencies existed between students who began a cooperative education program and those of like controlled characteristics who did not.
2. Participation in one year of cooperative education at the secondary level did not contribute significantly to the development of more desirable personalities as measured by the CPI.
3. Participation in one year of cooperative education at the secondary level did not contribute significantly to the development of Vocational Maturity as measured by the VDI.
4. Participation in one year of cooperative education at the secondary level slowed the development of at least ten of the eighteen characteristics measured by the CPI.
5. Objective measurement of certain internal developmental characteristics of cooperative education participants was possible and efficient.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Schmitt (Last name), Carlos (First name), R. (Middle name)

Exact Title A STUDY OF THE PROBLEMS OF PART-TIME INDUSTRIAL AND TECHNICAL INSTRUCTORS IN SELECTED MICHIGAN COMMUNITY COLLEGES

Degree granted Ph.D., Date 1971 No. of pages in report 178

Granted by Michigan State University (Name of institution) East Lansing, Michigan (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

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Statement of the Problem

To meet the challenge of securing adequate quantities of vocational-technical instructors, community college administrators have recruited persons directly from business, industry, health, and public service occupations to serve as part-time instructors. The problem arises from the fact that employment of these persons directly from nonteaching occupations permits individuals possessing high competence in technical subject matter, but lacking professional teacher preparation or teaching experience, to teach in the classroom or laboratory.

The purposes of this study were: (1) to identify problems of part-time and full-time industrial and technical instructors as perceived by their supervisors, the instructors themselves, and their students, (2) to identify procedures which supervisors and part-time instructors recognize as being helpful in solving their problems, and (3) to formulate recommendations which will assist the part-time instructors.

Methodology

The community college sample was made up of 11 institutions selected at random from 16 Michigan institutions operating reimbursable industrial and technical programs. The instructor sample was stratified on the randomly selected institutions, and was composed of two part-time instructors without professional teacher preparation and two full-time instructors with professional teacher preparation, from each of the 11 institutions. The supervisor sample was composed of the immediate supervisors of the instructors. The student sample was composed of students in classes taught by instructors who were interviewed, and who permitted the administering of a student rating form.

The data were gathered by means of individual interviews with 21 part-time instructors, 21 full-time instructors, and 20 of their immediate supervisors. Additional data concerning the instructors were gathered from 471 students, by means of a structured student rating form. The data were subjected to descriptive and inferential statistical analyses in order to answer the questions posed. Multivariate analyses of variance were used to test for problem differences between part-time and full-time instructor groups. Pearson Product-Moment Correlation tests were used to investigate the relationships between instructors' ratings and students' ratings.

Major Findings of the Study

The findings related to the supervisors' perceptions of part-time instructors' problems were: (1) methods and procedures in selecting and organizing course materials, (2) methods and procedures in grading and evaluating students, (3) skill in developing test materials, and (4) selecting, designing, and using teaching aids and related materials.

The problems as perceived by a majority of the part-time instructors were: (1) lack of materials such as course outlines, plans, and faculty handbook, which should be furnished upon appointment, (2) self-evaluation of one's effectiveness as a teacher, (3) adapting instruction to individual differences, (4) determining the various competencies required of graduates in one's subject area, (5) keeping abreast of current ideas and trends in one's occupational area, and (6) developing satisfactory tests and examinations.

Statistically significant differences were found between the full-time instructor and part-time instructor groups, based on students' ratings, with the higher positive ratings favoring the full-time instructor group regarding course organization. Although not statistically significant, full-time instructors were rated better on instructor involvement and course demands. The part-time instructor group was rated slightly higher on student-instructor interaction.

A significant relationship was found between part-time instructors' ratings on difficulty in course organization and students' ratings of their instructors' course organization.

Order No. 72-06,510, 178 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Schrag (Last name), Marie (First name), Carol (Middle name)

Exact Title AN ASSESSMENT OF SELECTED ATTITUDINAL CHANGES IN SECONDARY VOCATIONAL TEACHERS

Degree granted Ph.D., Date 1972 No. of pages in report 82

Granted by Michigan State University (Name of institution), East Lansing, Michigan (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To examine: 1) changes in confidence for teaching; 2) changes in open-mindedness; 3) the relationship of years of teaching experience, level of education and number of education courses taken to these factors; and 4) the relationship of the changes that occurred to the varying lengths of the orientation programs.

Source of data and method of study:

The teachers at three new Michigan Area Vocational Centers which opened Fall, 1971, participated in the investigation. The Confidence Level Inventory for Teaching and the Rokeach Dogmatism Scale were administered to the teachers THREE TIMES: on their first day of work; agter teaching three weeks; and after teaching six weeks. Background information was gathered on the first day of employment and compared to test scores obtained at the same time for the entire group of vocational education teachers.

Findings and Conclusions:

Vocational education teachers will become more open-minded through orientation and classroom teaching. Vocational education teachers vary considerabley in their confidence for teaching. A significant difference existed in the confidence for teaching test scores among the three teacher groups irrespective of time. Vocational education teachers do not significantly alter their confidence for teaching in the short run. The data does not support the notion that the length of orientation for vocational education teachers affects their open-mindedness and confidence for teaching. Open-mindedness of vocational education teachers is positively related to years of teaching experience, educational level, number of education courses taken, and confidence for teaching. Confidence for teaching of vocational education teachers is positively related to years of teaching experience. However, confidence for teaching does not have a significant relationship to the educational level or the number of education courses taken.

DATA SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Scott (Last name), Robert (First name), E. (Middle name)

Exact Title PRACTICABILITY OF ESTABLISHING AN AREA VOCATIONAL SCHOOL TO SERVE FIVE NORTHEASTERN MISSOURI COUNTIES

Degree granted Ed.D., Date 1965. No. of pages in report 193

Granted by University of Missouri-Columbia (Name of institution), Columbia, Missouri (City State)

Whe Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

P pose of Study

To ascertain whether or not it was educationaly practical and economically feasible to establish an area vocational school to serve the vocational needs of Lewis, Marion, Monroe, Pike, and Ralls Counties in Missouri

Source of data and method of study

Data for the study were obtained from 567 information forms returned by former studetns of the twelve participating high schools, from 622 forms returned by voters of the Hannibal school district, from 1598 forms completed by eleventh and twelfth grade students enrolled in the cooperating schools at the tipe of the study, and an analysis of the labor market needs of the five county area as well as the expressed labor needt of the state. Data were also secured from the census report, and records and reports on file in the State Department of Education.

Findings and Conclusions:

1. Unless steps are taken to provide additional vocational opportunities within the survey area, large numbers of job openings will rem in unfilled.
2. Since many students terminate their education at the secondary level, inproved programs of vocational education should be provided.
3. Since most of the people of the survey area are employed in industrial, business, and technical occupations, and since the major vocational interest of high school youth is in these fields, the schools of the survey area should provide a program of instruction emphasizing these occupations.
4. Federal, state, and local funds, plus student fees, are adequate to finance an area vocational school.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Sears, Jr. (Last name), Woodrow (First name), Harmon (Middle name)

Exact Title THE DEVELOPMENT OF A DATA-COLLECTION MODEL TO SUPPORT ORGANIZATION RENEWAL EFFORTS INITIATED BY THE WASHINGTON, D.C., CHAPTER, AMERICAN SOCIETY FOR TRAINING AND DEVELOPMENT

Degree granted Ed.D., Date 1971 No. of pages in report

Granted by The George W shington University (Name of institution) Washington, D.C. (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To develop and test a model which coyld be employed by the Washington, D.C., Chapter of the American Society for Training and Development to generate a data- based upon which organization renewal strategies could be predicated.

Source of data and method of study

In response to the need for a systematic data-collection process permitting a broad segment of the Chapter's membership to participate in developing statements concerning professional needs which the Chapter is not meeting, the Board of Directors appointed a Steering Committee to collaborate with the researcher in developing the model.

Based on the constraints defined by the researcher and the Steering Committee, selected sources from the literature on organization renewal, organization development and model-building were used for guidance in identifying and structuring the necessary elements in the model's planning, design, and application modules.

Findings and Conclusions:

1. The review of literature concerning OR, OD, and model-building resulted in the identification of elements which can be incorporated into a data-collection model.
2. The design of a chapter model must be preceded by the definition of constraints and anticipated outcomes.
3. The model applied to the Chapter had to include more than one data-collection methodology. The primary mode was structured, instrumented small groups. A secondary mode, questionnaires, elicited data from almost five times as many members as the primary mode.
4. A schematic model can be created which graphically illustrates the necessary elements required to achieve the purposes of its application.
5. The assumptions about participatory democracy underlying the primary mode of data collection were found not to be wholly appropriate for this target population.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Shell, Lon Ray
(Last name) (First name) (Middle name)

Exact Title ANALYSES OF NOISE IN SELECTED AGRICULTURAL MECHANICS FACILITIES

Degree granted Ed.D., Date 1971 No. of pages in report 122

Granted by Oklahoma State University, Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Scope and Method of Study. The purpose of this study was to analyze the different noises found in four agricultural mechanics facilities selected as being representative of two basic types, those constructed predominantly of concrete (cinder) block and brick veneer and those predominantly of steel. Instructional program type conducted in each facility was classified (1) laboratory skill oriented or (2) project construction oriented.

Speech interference levels were found by measuring the sound levels with a BRUEL & KJAER impulse precision sound level meter fitted with an octave filter set. The arithmetic averages of sound levels in decibels measured at 500 Hz, 1,000 Hz, and 2,000 Hz center band octaves were compared to table values to determine voice levels necessary at different distances adequate for communication while normal laboratory activities are ongoing. Equipment sound levels and noise patterns were analyzed. Sound levels and durations measured in the respective facilities were compared to criteria established by the Walsh-Healey Act in determining hearing damage risk. A questionnaire was administered to the students utilizing the respective facilities to determine (a) what noises annoy them most, (b) which of eight selected noise characteristics causes it to be annoying, (c) in which mental and physical activity are students engaged when annoyed most, and (d) the students perception of the aural environment with regard to the frequency of audio-communication interference caused by noises from normal class activities.

Findings and Conclusions. The most annoying sounds to students in the agricultural mechanics laboratory are those emitted from (a) pedestal and portable disc grinders and (b) chipping and hammering slag. The loudness of a noise is the most prominent sound characteristic which causes it to be annoying. Noises are most objectionable when the student is operating. The student does not feel that audio-communication is interfered with by noise in the typical agricultural mechanics laboratory. According to measured speech interference data, shouting to very loud voice levels are required for persons to effectively converse when six to 12 feet apart with normal activities ongoing. The larger, better acoustically treated facilities exhibited lower sound level readings although the amount of work taking place as indicated by percentages of machine use is more influenced with regard to aural environment than material building is fabricated of, or instructional program type being utilized. There were no sound intensities measured in typical agricultural mechanics facilities that would cause permanent hearing loss to the student at durations he would be exposed. From the findings, the investigator concluded that noise levels found in most agricultural mechanics facilities are not uncommon to what would be expected but that audio-communication is inhibited beyond a tolerable degree. It is suggested that teachers and students become more cognizant of noise pollution and its influence on the educational environment and means be found for rectification of problems that exist.

Order No. 72-21,987, 122 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Shigetoni, Samson, Shigeru
(Last name) (First name) (Middle name)

Exact Title AN ANALYSIS OF THE RELATED INSTRUCTION PROGRAM FOR ELECTRICAL APPRENTICES

Degree granted Ed.D., Date 1970 No. of pages in report 207

Granted by University of California, Los Angeles, California
(Name of institution) (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Apprenticeship as a form of education has been in existence for over 4,000 years. In the present decade it is estimated that apprenticeship will provide 12 percent of the nation's total skilled manpower. At least one in ten will receive all or part of his training through apprenticeship.

By combining on-the-job training and classroom instruction, and the opportunity to earn while learning, apprenticeship offers an effective means of teaching the skills and related elements of a trade. However, critics have challenged certain traditional practices. They question the propriety of continuing to rely upon the completion of a prescribed number of hours on the job as a measure for achieving journeyman status and believe that the emphasis should be on performance objectives.

In the light of these criticisms the present study was undertaken to examine the related instruction program for apprentices at the community college level. Specifically, it is concerned with the program for electrical apprentices at Honolulu Community College. Its purpose is to determine ways and means of improving the related instruction requirements of the electrical apprenticeship program. It is limited to an analysis of the related instructional phase and does not include on-the-job requirements, which are not under the jurisdiction of school officials.

Among the objectives of the research were (1) a study of the feasibility of placing emphasis upon levels of achievement rather than a required number of hours as a determinant for journeyman rating; (2) investigation of the possibility of using written and practical examinations to determine competency and awarding of credit for previous education or experience; (3) determination of the effectiveness of the electrical curriculum in meeting the needs of industry and the apprentices; and (4) exploration of the possibility of deleting or adding courses to the present related-instruction requirements.

The objectives of this research were achieved through the use of personal interviews, four sets of questionnaires, and statistical analysis. The four groups receiving the questionnaires were current apprentices, related-information instructors, employers of apprentices, and dropouts from the program.

The findings of the study included a consensus among apprentices, apprenticeship instructors, employers of apprentices, and dropouts from the program concerning the feasibility of developing a written and performance examination which could determine the competence of an apprentice or journeyman. Current apprentices were in agreement with the placing of emphasis upon levels of achievement rather than a required number of hours as a determinant for journeyman rating, and of those participating in this survey only the employer was in general disagreement with waiving the time requirement for those who satisfactorily pass trade competency tests.

By a ratio of almost twenty to one, the participants indicated their belief that the electrical curriculum, at worst, included most of the theory needed in the trade and, at best, included more theory than is needed by a journeyman. This overwhelming support from the various groups implies that the related instruction curriculum is comprehensive at present and is meeting most of the needs of industry and apprentices.

This finding is reinforced by respondents' failure to suggest items to be added or eliminated from the present curriculum. Suggestions to improve the curriculum were the inclusion of more practical work and demonstrations, the increase in use of multi-media techniques, the increase in the number of resource speakers, and an increase in mathematics and specialty courses. The majority of the apprentices also indicated that the mathematics and blueprint reading courses were helpful and were related to their work, while a few wanted related-instruction correlated with the on-the-job experiences.

This research study is the first attempt to provide the various groups an opportunity to express their views and concerns about the related-instruction aspect of the apprenticeship program. Involvement of the different groups is important because there are certain kinds of information which only a particular group can provide. It is recommended that similar studies be conducted with other apprenticeship programs at Honolulu Community College and at other colleges in other parts of the United States.

Order No. 71-16,363, 207 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Shultz, Fred, Alfred
(Last name) (First name) (Middle name)

Exact Title SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS

Degree granted Ed.D., Date 1971 No. of pages in report 174

Granted by Oklahoma State University, Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Scope and Method of Study. In this study, an effort was made to determine the image of vocational education in Oklahoma as perceived by members of a public categorized by levels of employment, and to compare the image of vocational education perceived by persons comprising the respective categories in selected cities.

Six locations in Northern-Central Oklahoma were selected as sites from which to secure data for the study. In order for a city to be selected as a location for this study, it was required to have at least three of the following four programs in its secondary public school system: trade and industrial education, business and office education, vocational agriculture education, and distributive education. The public in each location consisted of twenty individuals—four representatives of each of the following occupational categories: professional, technical, skilled, semi-skilled, and unskilled. Data were collected by the interview method at each of the designated interview sites.

Findings and Conclusions. As a group those interviewed responded neutrally regarding the adequacy of vocational education offerings, alignment of vocational programs with needs of local industry, and information dissemination about opportunities available in vocational education. However, the public had a favorable perception toward vocational education in comparison with the rest of the educational system.

It was concluded that the respondents in the study were in agreement that the quality of vocational education programs, in Oklahoma, was good and that they perceived these programs as being able to serve students of all ability levels. They also agreed that vocational education programs were accomplishing their major purpose by providing education for gainful employment for all who desire it, need it and show the initiative to obtain it.

Overall, the investigator concluded that, in general, the public interviewed was uninformed about vocational education; however, their overall perception toward these programs would appear to be favorable.

Order No. 72-21,988, 174 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Shunn (Last name), Donald (First name), William (Middle name)

Exact Title THE EFFECTS OF THE FISHER BILL ON THE SECONDARY INDUSTRIAL ARTS PROGRAM IN PUBLIC SUPPORTED CALIFORNIA SCHOOLS

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

1) Enumerate several important requirements of teacher certification; 2) To specify the provisions of the Fisher Bill relating to those requirements; 3) To examine the effects of those specifications on the certification of industrial arts teachers in secondary education in California.

Source of data and method of study:

Two questionnaires were used to solicit information form: (1) state supported public colleges which had industrial arts teacher preparation programs, and (2) secondary school districts which provided industrial arts instruction (no secondary school district over 100,000 population participated in this study). The questionnaires were both subjective and objective and provided statistical information as well as opinions from the participants.

Findings and Conclusions:

1. Prior to the Fisher Bill the colleges had a well organized but varied program.
2. A great diversity of electives resulted from the Fisher Bill.
3. A greater flexibility of requirements resulted with the demise of the Fisher Bill.
4. The Fisher Bill tended to limit the industrial arts students in the choice of a minor area.
5. Industrial arts students, faculty, and departments suffered in quality, prestige, and curriculum during the life of the Fisher Bill.
6. Prior to the Fisher Bill school districts employed those teachers who were well qualified as industrial arts teachers.
7. Prior to the Fisher Bill annual attrition rates were lower
8. A shortage of industrial arts teachers was created.
9. The quality of industrial arts teachers decreased as a result of the Fisher Bill.
10. With the demise of the Fisher Bill the quality of Industrial arts teachers tended to improve.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Shymoniak (Last name), Leonard (First name), Roy (Middle name)

Exact Title THE ANALYSIS OF COSTS AND EFFECTIVENESS OF VOCATIONAL EDUCATION PROGRAMS IN THREE SELECTED CALIFORNIA COMMUNITY COLLEGES

Degree granted Ph.D., Date 1972 No. of pages in report

Granted by University of California, Los Angeles (Name of institution) Los Angeles, California (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

This study, in addressing itself to the needs of the local administrator, assumed a cost-effectiveness analysis framework to determine the cost and the effectiveness of general and vocastional education programs in three California community colleges.

Source of data and method of study·

The procedures used to collect and analyze program-cost data were adapt from Lindman, Developing Alternative Models for Financing Vocational Education, and the California State Department of Education Manual, Planning, Programming, Budgeting System Manual for State of California School Districts. Two types of costs were presented for the different programs considered: the cost per Student Contact Hour, and the incremental cost of training a graduate.

Data required to measure the effectiveness of vocational education programs were obtained through a mail' questionnaire specifically developed for this study.

Findings and Conclusions:

1. It was found that training a vocational education graduate in the three colleges studied was more costly than training a general education graduate.

2. Two factors identified as contributing most to incremental cost were; (1) the higher cost per Student Contact Hour attributable to lower level utilization of facilities, instructional equipment, and faculty resources in vocational educaiton; and (2) the greater number of contact hours of instruction received by vocational education graduates.

3. Three of the five programs analyzed for effectiveness were found to be successful in attaining their objectives. The study estimated that the benefit gained by graduates of these three programs was about $1,300 for each of the first two years after leaving college.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Siewert, Norman, Wayne
(Last name) (First name) (Middle name)

Exact Title ADOLESCENT SELF-OCCUPATIONAL PERCEPTIONS AND THEIR RELATIONSHIP TO CERTAIN DEPENDENT VARIABLES -- SHOP ACHIEVEMENT AND SOCIABILITY

Degree granted Ed.D., Date 1971 No. of pages in report 133

Granted by Pennsylvania State University University Park, Pennsylvania
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The primary objective of the study was to research various relationships between the inferred perceived self-concept and the inferred perceived occupational concept through Q-sorts of a select group of adolescents enrolled in tenth, eleventh, and twelfth grade occu ional program areas. The study also researched the relationship between certain dependent variables, shop achievement and social behavior, and congruence between perceived self and occupational identity for these same subjects.

Within this framework, the following two questions and two hypotheses were empirically studied:

1. What is the range of congruencies between the self-concept and occupational identity for a group of occupational students selected at random from each of three grades, ten through twelve?
2. What is the difference between the observed congruencies of youngsters in tenth, eleventh, and twelfth grades?
3. Within each of the grades, ten through twelve, students' shop achievement increases as the congruence between their perceived self-concepts and their perceived occupational concepts increases.
4. As the congruence between students' perceived self-concepts and perceived occupational concepts increases, so do the students' social interactions with the group increase.

A random sample of 300 subjects, 100 from each grade, was selected from a group of 516 tenth, eleventh, and twelfth grade students enrolled in the auto mechanics, auto body, machine trades, basic electricity, basic electronics, mechanical drafting, sheet metal, welding, and printing occupational programs at the Altoona Area Vocational-Technical School, Altoona, Pennsylvania.

The 300 subjects were asked to complete an 80-item Q-sort twice—first, to determine their inferred perceived self-concept and, second, to determine their inferred occupational identity (concept). Tenth grade shop grades and the eleventh and twelfth grade Ohio Trade and Industrial Education Achievement total test scores formed the basis for assessing shop achievement. A three-statement sociometric instrument was administered to these same subjects to determine their sociability while in the occupational class. The median was the point on the score scale for determining the subjects' congruency or non-congruency (self-occupational correlation coefficients). The Fisher Z transformation test, the Pearson *r* significance test, and *t*-ratios formed the basis for the statistical analysis.

Results of the investigation revealed that the ranges of the correlation coefficient intervals for each of the three grades were as follows: tenth grade—negative interval of .20 to .29 to a positive interval of .80 and .89, eleventh grade—negative interval of .30 to .39 to a positive interval of .90 to .99, and twelfth grade—negative interval of .01 to .10 to a positive interval of .90 to .99. The data indicated that about 30 percent ($r = .22$, $p < .05$) of the subjects perceived their self-concepts as being quite different from their perceptions of a worker in their chosen occupation.

The Fisher Z transformation test for significant difference between the correlation coefficient means for each of the grade comparisons revealed low and insignificant ($p < .05$) Z values.

The results indicated that shop achievement and congruency between the self-concept and the occupational concept of the subject were related (*t*-ratios, $p < .05$) for each of the grades, ten through twelve. The independent pooled *t*-test was also used to determine the possible relationship between a subject's self-occupational congruency and the second variable, sociability. The size of the *t*-ratio values indicated that sociability and congruency between the self-concept and the occupational concept of the subject were related ($p < .05$) for each of the three grades, ten through twelve.

Order No. 72-9526, 133 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sine , Jr. (Last name), John (First name), Milton (Middle name)

Exact Title DEVELOPING OCCUPATIONAL PROGRAMS IN RURAL COMMUNITY COLLEGES

Degree granted Ph.D., Date 1972 No. of pages in report 147

Granted by Catholic University of America (Name of institution) Washington, D.C. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The rural community college is faced with a lack of resources critical to the development of occupational programs. A study by the American Association of Junior Colleges indicated that inadequate financial support compounded by the rising cost of salaries, maintenance, and equipment made occupational program development in the rural community college difficult.

It was the first purpose of this study to determine the extent to which selected rural community colleges utilized standard methods and requirements in the development of specific occupational programs. To fulfill this purpose, the researcher constructed the following list of eight "standard" methods and requirements for program development that were frequently or strongly recommended in recent literature:

1. The Manpower Survey
2. The Occupational Advisory Committee
3. The Full-Time Department Chairman
4. Determining the Potential Student Enrollment
5. The Occupational Skills Survey
6. Determining the Longevity of the Program
7. The Instructional Department
8. The Faculty Curriculum Committee

From the list of standards, a descriptive questionnaire was developed and mailed to 100 rural community colleges located in twenty states. Responses from the questionnaire indicated that the small rural colleges sampled did not use a majority of the standard methods in developing an occupational program. The average number of methods used by the colleges was approximately four out of the possible eight. The data indicated that occupational programs were established in small rural community colleges without a significant use of the eight standard methods for occupational program development.

The second purpose of the study was to determine how selected rural community colleges developed an occupational program. Ten occupational programs reported in the descriptive survey were chosen for a case history. The detailed process of developing each program was obtained through personal interview with the program's director and compared with the list of standard methods previously developed. The researcher discovered that the rural community colleges depended not as much upon standard methods of developing occupational programs as they did upon their own ingenuity in capitalizing on changing conditions and resources found within their own communities. The inconsistent and meager resources available in the local communities resulted in distinctly different development methods than those used by other rural colleges. Furthermore, the colleges often used dissimilar methods for developing occupational programs within their own institutions.

Occupational program development in the colleges studied may be described as perceptive, expeditious, inventive, and tenacious. It was not especially judicious, procedural, analytical, or constant. To make it so would probably place the rural community college at a disadvantage.

Order No. 72-18,353, 147 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Slaper (Last name), Frank (First name), Milton (Middle name)

Exact Title SOCIALIZATION OF TECHNICAL STUDENTS

Degree granted _____, Date 1972 No. of pages in report _____

Granted by Colorado State University (Name of institution) Fort Collins, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To compare the socialization of technical students in three types of technical education institutions. To determine whether the organizational environment of the three types of educational institutions was significantly different, thereby effecting a difference in the socialization of the technical students.

Source of data and method of study

The population selected for the socialization study consisted of freshman post-secondary technical drafting and electronics students from three area vocational schools, four comprehensive community colleges, and one technical institute in Kansas. In addition to the population selected from Kansas, freshman post-secondary technical drafting and electronics students from one technical institute in Nebraska and one technical institute in Oklahoma were also included. The study was conducted during one academic year from September 1970 until May 1971.

The population selected for the environmental study consisted of five students and five instructors chosen at random from each of the ten institutions considered for the socialization study. The portion of the study concerning the environment of institutions was conducted during the spring of 1971.

A pretest-posttest design was used with the socialization study to observe changes in attitudes which occurred during the academic year. For this study the Miskimins Self-Goal-Other Discrepancy Scale was administered to the students of the ten institutions.

Findings and Conclusions:

1. The analysis of results of the regression analysis did not support a significant increase or decrease in posttest scores from the pretest scores for the subjects under investigation. The analysis indicated a definite subject by institution interaction as well as an indication of statistical regression for the individual scores.

2. The analysis of the environmental study indicated a definite difference in perception between students and instructors with respect to the environment of the various institutions. However, the use of the student mean scores on the study does not support a significant difference in environment as measured with the Organizational Climate Index.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Smith (Last name), Earl (First name), Melvin (Middle name)

Exact Title AN ANALYSIS OF THE TOOLS AND MACHINES USED IN THE INDUSTRIAL ARTS JUNIOR HIGH SCHOOL PROGRAM IN CALIFORNIA

Degree granted Ed.D., Date 1971 No. of pages in report 245

Granted by University of California (Name of institution), Los Angeles, California (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

It was the purpose of this investigation to determine the common tools and machines used in the subject areas of industrial arts and to determine the common core of tools and machines used in the total industrial arts junior high school program in California.

The population and sample for the investigation was the industrial arts teachers in the junior high schools in California. A mailed questionnaire was used to collect the data. A total of 736 questionnaires were mailed. A total of 527 were returned, for a 71 percent response.

The subject areas included in the study were General Industrial Arts, Industrial Drawing, Graphic Arts, General Crafts, Electricity/Electronics, General Metals, Power/Auto Mechanics, and General Woods.

The results of the investigation were reported in two parts. The first section provided descriptive data regarding the common tools and machines used in each of the areas studied. Data were gathered on (1) common tools and machines available for student use, (2) student use of common tools and machines, (3) grade level of students using tools and machines, (4) skill level required for tool and machine use, (5) the type of instruction used to teach tool use, (6) tools and machines involved in accidents and injuries, and (7) consideration given to tool and machine use in project selection.

The second section provided descriptive data regarding the common tools and machines used in the total industrial arts program. Data were compared from the various areas to determine the common core of tools used by students in the various area of industrial arts.

The study established in part that (1) there are basic common tools and machines used by the students in each area. (2) There is a common core of tools and machines used in several areas of industrial arts. (3) There are several common tools and machines involved in accidents and injuries in each area. (4) The skill level required for use of the common tools and machines is generally low. (5) The grade level of the classes had little effect on the tools and machines used by the students. (6) Class instruction was the type most often used with all tools and machines and the amount of group and individual instruction increased with the tools requiring higher skill level. (7) Primary consideration is given to the tool and machine use of the student when selecting projects in industrial arts.

Order No. 72-9237, 245 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Smith, Sr. (Last name) Jay (First name) T. (Middle name)

Exact Title ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE

Degree granted Ed.D. Date 1971 No. of pages in report 176

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to write the history of the origin and development of industrial education at Alcorn Agricultural and Mechanical College from 1871 to the beginning of 1971.

METHOD OF RESEARCH: Data were assembled from a variety of sources using the historical method of research.

SUMMARY: During the period from 1871 to 1971, the industrial education department at Alcorn College endeavored to make a contribution to the education of Negroes in the state of Mississippi. The department had a late beginning as well as a slow development. Since the funds available were meager throughout this period, the administration decided that industrial training would be more economical for the college if it was gained by maintaining the campus buildings.

The mechanic departments became realities in 1901 when courses in carpentry, blacksmithing, printing, and shoemaking were organized. These first trade courses were three years in length and did not offer college credit.

Shortly before World War I, manual training was added to the curriculum to meet the handicraft needs of those students who did not want to study a trade.

Under the provisions of the Smith-Hughes Act, passed in 1917, Alcorn trained its first trade and industrial teachers. The lack of demand for these teachers in the Negro schools of Mississippi led to the discontinuance of the industrial teacher education program in 1922.

At the beginning of the economic depression of the 1930's, the trades were dropped from Alcorn's Curriculum and replaced by a mechanical and electrical engineering department. After the engineering department did not succeed, the college established its first four year degree granting curriculum in industrial education in 1935. This curriculum was designed to train teachers of industrial subjects. In 1937, however, a building construction option was added and during World War II the program expanded to include terminal trades.

In 1961, the college was reorganized into three divisions--arts and science, education, and vocational education. Industrial education, along with agriculture and home economics, became a department in the vocational education division.

FINDINGS: There has been a lack of appreciation of the meaning and purpose of industrial education at Alcorn College by the majority of Negroes in Mississippi. Administrators at the college and state levels have not been familiar with or have not accepted the objectives of the curriculum. Many of the teachers of industrial education at Alcorn had been well trained in their field, but they were hampered by insufficient funds which resulted in crowded classes, inadequate facilities, and extra maintenance duties. The college presidents have at times shown sincere aspirations for improving industrial education at Alcorn, but they have not enjoyed the cooperation and encouragement of the board of trustees. When the present study was made in 1971, there was a steady increase in student enrollments in the department and a new and one half million dollar fully equipped, building had been requested.

CONCLUSIONS: It would appear that the industrial education department at Alcorn College has never been one of the institution's outstanding educational programs. Throughout much of its history, the department's curriculum was limited to rather narrow areas. It received inadequate financial support and had to struggle continuously to maintain a subsistence existence. In short, the industrial education department had not reached its full potential. Yet, to large measure, this situation did not result from weaknesses inherent within the department. Rather, the energies of the college were centered on liberal arts and agriculture. The persons of the college administration during the early years may be described as favoring only so much mechanical training as might be useful to a farmer.

Order No. 72-10,564, 176 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Smith, Kenneth, T.
(Last name) (First name) (Middle name)

Exact Title EFFECTS OF AN INDIVIDUALIZED SYSTEMS APPROACH CURRICULUM MODEL IN A UNIVERSITY LEVEL GRAPHIC ARTS PROGRAM

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study To investigate the effects of an individualized curriculum systems design known as learning activity packages. The specific areas of inquiry were: 1. What is the relationship between achievement using learning activity packages and select personality factors? 2. What relationship exists between chronological age, experience, grade point average and one's ability to accept the learning activity package? 3. What is the effectiveness of the model of the curriculum systems design known as learning activity packages? 4. What changes in student attitudes will occur about the curriculum systems design from initiation to completion of the course? 5. What are the recommendations for redesign and improvement of the individualized curriculum systems design at the university level?

Source and Method of study: Data was obtained from within an experimental atmosphere consisting of two University of Northern Colorado industrial arts classes and from student questionnaires, student data cards, anecdotal records, LAP achievement cards and student evaluation sheets. Statistics were formulated by using Pearson Product-Moment correlations. The level of signicance was at the .05 level of comfidence. Additional data includen individual scores from the Sixteen Personality Factor Test.

Findings and Conclusions: Results were: 1. Term achievement distribution evolved into a positively skewed curve; 2. The Sixteen Personality Factor Test was incapable of predicting term achievement; 3. Chronological age and previous experience were unable to determine a student's ability to accept the learning activity package; 4. Student grade point average is an effective measure of a student's ability to accept the learning activity package; 5. Students' attitudes regarding the continuance of the curriculum systems design were positive; 6. Students' recommendations for redesign and improvement included a) complete dissemination of the teacher's role in an orientation program, b) setting time limits for each objictive, c) the renewal of more technical oriented activities correlating with the basic graphic arts concepts.
Conclusions were: 1. Variation of term achievement scores indicated that instruction using learning activity packages does not meet the needs of some students; 2. The Sixteen Personality Factor Test cannot be used as a predictor of success in the program using learning activity packages; 3. The present curriculum systems design should be modified to assure a more effective design.
Additional investigation is required to determine criteria that can be used to indicate those students who would be successful in an individualized curriculum systems design. Identification of characteristics possessed by low achievers using this system should be determined and alternate approaches devised for greater student success.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Soltys (Last name), Robert (First name), George (Middle name)

Exact Title THE USE OF THE "PATTERN SEARCH TECHNIQUE" AS A TOOL FOR IDENTIFYING THE CHARACTERISTICS OF VOCATIONAL-TECHNICAL STUDENTS ATTENDING A TWO-YEAR PUBLIC COMMUNITY COLLEGE

Degree granted Ed.D., Date 1971 No. of pages in report 191

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The recent rapid growth of community colleges in California has attracted many students who would otherwise not be attending college. Vocational-technical education is one of the pertinent areas of education now receiving increasing attention in the community college. While this is largely a result of the population boom, there has also been increasing interest in education by the American people. Automation and technological development have raised the level of job competition beyond the reach of the high school graduate who, in the past, would have had but a fleeting interest in college. These young people now find it necessary to attend a community college in order to obtain advanced occupational preparation. Identification of student characteristics is essential to the development of institutional goals and educational goals for vocational-technical students. The young adults who attend two-year public community colleges come from all types of social, economic, racial, and cultural backgrounds and vary in scholastic ability, achievement, and motivation. The need for improving the methods of generating meaningful information about the students who are attending these institutions was never greater.

Procedure of the Study

This study explores the usefulness of a relatively recent systematic and highly technological system in providing significant basic information about vocational-technical students in a two-year public community college. Although this study is basically methodological, it also aims at (1) developing and defining a set of vocational-technical student attributes; (2) collecting information about these attributes from a random sampling of students; and (3) subjecting these data to a relatively new but promising method of research.

Sixty student characteristics were defined and categorized as indices of student talent, along with individual family and financial variables. A questionnaire listing these sixty "raw characteristics" was administered to 405 randomly selected students (approximately 20 percent of the total student enrollment) at Rio Hondo College, Whittier, California.

Principal Findings

This study investigated the use of the "Pattern Search and Table Translation Technique" to: (1) obtain additional "base-line" data about a particular segment of the male student population which the college serves, and to provide guidelines for use of these data in guidance and curriculum development; (2) develop a data bank of student characteristics from which institutional goals may be formulated; (3) provide the institution with information about the students that will enable the matching of operational educational objectives to student needs; (4) develop a set of characteristics unique among vocational-technical students for use by the college in planning vocationally gainful educational objectives for these students; and (5) provide a method for identifying distinguishing characteristics of students who forecast a vocational-technical choice from the curriculum.

Conclusion

This study demonstrates a methodology which can be useful for generating and assessing information for school administrators, school boards, counselors, teachers, and others by separating inherent characteristics of community college students into patterns. The computer winnows the data, retaining only the significant tables for consideration.

Order No. 72-9238, 191 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sonner (Last name), Jan (First name), Raymond (Middle name)

Exact Title A STUDY OF THE PERCEPTIONS OF THEIR CURRICULA BY THE 1966-1969 GRADUATES IN ENGINEERING, ENGINEERING TECHNOLOGY, AND INDUSTRIAL TECHNOLOGY AT SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE

Degree granted Ph.D., Date 1972 No. of pages in report 208

Granted by Southern Illinois University (Name of institution), Carbondale, Illinois (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to describe, compare, and draw conclusions concerning the perceptions of baccalaureate graduates in engineering, engineering technology (ET), and industrial technology (IT) at Southern Illinois University at Carbondale for the years 1966-1969. Perceptions were sought to determine: 1) base-line information concerning the graduates' occupational positions and plans for the future, 2) their assessment of the content of their curriculum, and 3) their views of certain nationally accepted objectives of higher education.

Four hypotheses were developed, and a questionnaire was designed to test them. Letters were mailed to 386 graduates; 315 responses were received.

Chi square statistics were used to test the hypotheses. The first hypothesis, which stated,

> There will be no significant differences among the three groups of graduates in their occupational positions or in their plans for the future,

was accepted on the basis of: 1) the nature of their companies; 2) the extent to which the graduates felt they were in positions for which their degrees prepared them; and 3) educational degree goals. It was rejected on the basis of: 1) occupational titles; 2) the perceived nature of present and anticipated occupational roles; 3) educational accomplishments since graduation; and 4) educational areas in which study was planned.

The second hypothesis, which stated,

> There will be no significant differences among the three groups of graduates in their perception of the curriculum. . . [nine items],

was accepted on the basis of: 1) satisfaction with choice of curriculum; 2) curriculum mixture in general, and in 18 of 23 specific subject areas; 3) occupational utility in 8 of 13 subject areas for present use, and in 7 of 13 for anticipated use; 4) overall effectiveness of the teaching-learning process; 5) depth or degree of specialization; 6) mathematical level; 7) theoretical level; and 8) requirements in laboratory work. The hypothesis was rejected on the basis of: 1) curriculum mixture in 5 of 23 subject areas, and 2) occupational utility in 5 of 13 for present use, and in 6 of 13 for anticipated use.

The third hypothesis, which stated,

> There will be no significant differences among the three groups of graduates in their assessment of the *importance* of certain nationally accepted objectives of higher education,

was accepted for 43 of 49 objectives.

The fourth hypothesis, which stated,

> There will be no significant differences among the three groups of graduates in their assessment of the *achievement* of certain nationally accepted goals of higher education,

was accepted for 43 of 49 objectives (not the same 43 as above).

The following general conclusions were warranted:

1. Engineering and ET graduates were awarded essentially the same occupational titles, most of which included the word "engineer"; but the engineering graduates perceived their occupational roles to be more scientific or creative.
2. Approximately one-third of the graduates of all three programs took essentially industrial engineering positions in manufacturing-oriented companies, and performed what might be described as functional or technical tasks.
3. Approximately 45% of each group planned toward technical management positions in the next decade, and approximately half of those who planned graduate work expected to study in the management area.
4. The graduates of all three programs were satisfied with their choice of curriculum, believed themselves to be in positions for which their programs prepared them, and generally planned to stay in such positions.
5. There was an unexpectedly large percentage of graduates (over 50%) from the two technology programs planning to get master's degrees.
6. Although reasonably happy with the mathematical level of their programs, the graduates gave some indication that both the technical core and the technical specialization were somewhat too theoretical, lacking practical emphasis or occupational relevancy.
7. The graduates of all three programs felt a strong need for more specialization and wanted more laboratory work in it.
8. They showed some hostility toward, and wanted to decrease, general studies requirements in art, music, literature, philosophy, and health.
9. There was agreement that clarity of thought and expression was one of the most important objectives of higher education.
10. Engineering and ET graduates were more inclined toward mathematics, science, and basic engineering than were the IT graduates, who were more concerned with manufacturing and management.
11. All three groups of graduates indicated an under-emphasis of areas relating to economics.
12. Concerning curricular revision, the graduates of all three programs proposed a decrease in humanities and health education requirements and an increase in management and specialized courses.

Order No. 72-24,369, 208 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Suess (Last name), Alan (First name), Roman (Middle name)

Exact Title AN EXPERIMENTAL STUDY COMPARING THE EFFECTIVENESS OF VARYING DEGREES OF MANIPULATION ON THE DIRECTED DISCOVERY METHOD OF PRESENTING PRINCIPLES OF ORTHOGRAPHIC PROJECTION

Degree grarted Ed.D., Date 1962 No. of pages in report

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To provide evidence on the type and sequence of manipulation on the directed discovery method of teaching meaningful technical information. A secondary purpose of this study was to replicate the experimental directed discovery treatment developed by John D. Rowlett and described in his unpublished Ed.D. dissertation completed at the University of Illinois in 1960.

Source of data and Method of Study:

The task employed in the study was selected principles of orthographic projection. Orthographic projection is a graphic method of representing the precise shape of an object in one or more views on a single plane. Instruction included: (1) the names and locations of six possible views used in this system: (2) projection of dimensions from one view to another; (3) the representation of normal, inclined and curved surfaces; and (4) line symbols representing visible and hidden characteristics and line denoting planes of projection.

Findings and Conclusions:

1. There was nc difference in achievement between treatment groups, as measured by tests of retention administered twelve days and six weeks after instruction.
2. There was no difference in achievement between treatment groups, as measured by teste of retention administered twelve days and six weeks after instruction.
3. There was no difference in achievement between treatment groups, as measured by tests of transfer administered twelve days and six weeks after instruction.
4. There was no interaction between the amount of mainpulation and ability level as measured by criterion tests administered immediately, twelve days and six weeks after instruction.

Conclusions and generalizations based on the findings of this study must be made with great caution since the mean achievement of the treated subjects, while consistently higher, did not differ significantly from the mean achievement of the unisntructed control subjects on any criterion measur except six weeks retention.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Spaulding (Last name), Lloyd (First name), Frederic (Middle name)

Exact Title A STUDY OF RELATIONSHIPS BETWEEN SELECTED CHARACTERISTICS OF SHOP AND LABORATORY INSTRUCTORS AND STUDENT ACHIEVEMENT IN VOCATIONAL AND TECHNICAL EDUCATION

Degree granted Ed.D., Date 1971 No. of pages in report 217

Granted by North Carolina State University (Name of institution) Raleigh, North Carolina (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Data from the Achievement Measures Project, a federally funded three-year study which developed achievement test instruments for vocational and technical school graduates, were used as criterion measures when describing the category of any participating instructor contacted in the study. Two hundred and twenty instructors in sixty-three institutions in seven states constituted the population studied. These instructors were those whose classes had been tested during the previous two years of the Achievement Measures Project. Each instructor was identified with his class and was categorized in an upper half or lower half position in the analysis, depending upon how well his class achieved in relation to the overall population. Curriculum areas in the investigation were Electronics Technology, Electronic Data Processing Technology, and the trades of Auto Mechanics, Electrical Installation and Maintenance, Heating and Air Conditioning, Machinist and Radio and Television Servicing.

The writer felt that this study would:

1. Be of assistance to local administrators who have to judge the potentiality of instructor candidates who come directly into teaching from industry.
2. Suggest some inferences regarding state and local certification requirements and policies in the areas of vocational and technical education.
3. Point out the need for the establishment of state and local machinery for recruiting and qualifying teaching personnel in order to satisfy the critical shortage which exists.

Ninety-one characteristics were analyzed in six different ways:

1. Population Data for 1967
2. Population Data for 1968
3. Population Data for Both Years
4. Selected Curriculum Data for 1968—Auto Mechanics
5. Selected Curriculum Data for 1968—Electronics Technology
6. Selected Curriculum Data for 1968—Machinists

The statistical treatment of the data was simple and direct and utilized the tests of x^2 and t for significance.

Hypotheses of the study stated that in the areas of educational, technical, teaching, socio-cultural, and attitudinal backgrounds and activities, there were no significant relationships to student achievement. Instructors whose students had been previously tested within thirty days of graduation, using the tests developed by the Achievement Measures Project were dichotomized into high and low groups.

The results showed that few of the characteristics studied appeared to be useful in describing a good or a poor teacher. A few of the items studied agreed with the opinions of other researchers and appeared to achieve more impact for not having achieved a statistically significant degree of difference.

The study showed that, generally, the profile of the instructor who produced a graduating class with better than average achievement appeared thus:

1. He was a high school graduate, but not a college graduate, although he graduated from a college preparatory course.
2. He described his religious activities as "regular" or "rare", seldom as "frequent".
3. He read over five different kinds of publications.
4. He was married and had one child.
5. He worked five hours per week on a job outside the school, and his wife had a part-time job.
6. He served over four years in active military service and five plus years in the reserves.
7. His teaching load was around twenty hours per week.
8. He placed 80 per cent of his graduates in relevant jobs.

The instructor who produced below average classes was not altogether a reversed mirror image of the above.

1. He was more often a college graduate who had graduated from the general course in high school.
2. He classified himself as a "frequent" church goer.
3. His teaching load averaged nearly 30 contact hours per week.
4. His family averaged five or more people.
5. He worked an average of 15 hours per week outside of the school.
6. He spent over 12 years in military reserve unit.
7. He placed only 60 per cent of his graduates in relevant jobs—more of his students appeared in the "unemployed" or "unknown" categories.

Of greater importance, perhaps, was the fact that one item did not show any degree of significant difference between the two kinds of instructors studied. The item of length of wage-earning field experience was statistically sterile, but the inference which can be drawn should affect the future thinking of policy makers, all over this nation, as they study ways and means of attracting qualified people into vocational or technical teaching out of industry itself. The study showed that it is not particularly important for an instructor candidate to have been in industry for any specified length of time. To continue to use such a requirement as a criterion measure of a potentially good instructor is questionable. Some other qualifying policy might be sought so that potentially fine instructors are not prevented from becoming teachers solely by such an unrealistic regulation.

The component parts of each hypothesis of the study showed that significant differences existed so seldom and in such minor degree, that all five null hypotheses were accepted.

Order No. 72-10,096, 217 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sprankle (Last name), Norman (First name), Harold (Middle name)

Exact Title A TASK ANALYSIS STUDY DIRECTED TO IDENTIFY ELECTRONIC SKILLS AND KNOWLEDGE REQUIRED FOR OCCUPATION IN INDUSTRY

Degree granted Ed.D., Date 1971 No. of pages in report 355

Granted by University fo California (Name of institution), Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem

The planning and preparation of electronics curricula is in part dependent upon an awareness of current industrial occupational data. This study attempted to answer the following questions:

1. What are the essential electronic skills and knowledge necessary for the performance of identified occupations, and how frequently are they required?
2. In what ways do supervisors agree and/or disagree with electronic skills and knowledge responses and frequency ratings as compared with reports from individuals employed in the occupations under study?
3. What are the common skills and knowledge statements identified with occupations in the electronics industry?
4. What are the anticipated tasks or needs for electronic occupations in industry?
5. What trends are apparent for the occupations under study in terms of employment needs and anticipated changes in occupational skills and knowledge?
6. Where do individuals in electronic occupations obtain their formal training, and how much do they receive?
7. Is there a relationship between industrial arts electronics education and related occupational stability?
8. Is there a relationship between industrial arts electronics education and related occupational selection?
9. Where do individuals in electronic occupations learn their related job skills and knowledge, and how much occupational training have they received?
10. Is there a relationship between electronic occupations and employed work experience?

Procedures

This study progressed in a sequence of steps.

1. Review and identification of electronics occupations in the *Dictionary of Occupational Titles*.
2. Preparation of the instrument for on-the-job presentation to electronics employees and supervisors.
3. Identification of companies and individuals to cooperate in the study, and presentation of the instrument.
4. Review of the literature such as occupational guides, job specification sheets, and published literature from public and private companies and agencies.
5. Processing and tabulation of data into form for final presentation using a CDC 3150 computer.

Findings

1. Electronic skills and knowledge were identified for 82 occupations as reported by 219 individuals.
2. Composite results indicate a 50 percent or higher level that supervisors and employees agree for 96 of 190 instances whereas employees disagree only for 2 and supervisors disagree only for 9 of the 190 items.
3. Common skills and knowledge items in electronics were identified: 69 of 190 items composite for the study and varying from 33 to 133 as identified for individual industries.
4. Anticipation of specific needs or tasks for electronics occupations was not well identified, but the trend pointed toward more complexity of tasks and more related knowledge.
5. The composite occupational trend indicated an increase in numbers of electronic positions and degree of training required.
6. Formal training for employees in electronic occupations varied for individual occupations and for the industries under study, but the composite average results indicated 11.9 semesters of junior-senior high school and 4.3 semesters of college training.
7. Electronics as an area of industrial arts was reported by 45 of 103 employees for an average of 3 semesters and compared with 12.7 average years in electronic occupations as reported by 103 employees.
8. Industrial arts electronics was found to relate directly to employment in four industries: any (service), electronics, electronic computer, and radio and television broadcasting.
9. Employees in electronics occupations learn the skills and knowledge from a variety of sources, but trade/technical schools were reported most common in terms of numbers in attendance and average number of months.
10. Individuals employed in electronics occupations tend to remain in the field as indicated by a composite 12.7 years electronics experience as compared to 15.1 years total experience. Radio and television broadcasting occupations had the highest comparative ratio and number of years in service, and the telephone and telegraph industry had the lowest ratio while the electronic computer industry reported the least average number of years total working experience.

Order No. 72-2915, 355 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Stamboolian, Jr. (Last name), John (First name), Karopa (Middle name)

Exact Title The Effect of Positive Verbal Reinforcement Upon Achievement and Attitudes of Selected Industrial Arts Classes

Degree granted D.Ed., Date 1972 No. of pages in report 124

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. (x)

Purpose of Study: To ascertain the effect of an increase of positive verbal reinforcement on selected industrial arts pupils from their achievement test scores and their attitudes toward the teacher and the course.

Source of data and method of study: Four teachers/schools were randomly selected from eleven junior high schools located in the Dallas Independent School District. World of Construction programs were chosen because of the researcher's need for similarity of subject matter. Control and experimental classes were randomly chosen. Experimental classes received an increase of positive verbal reinforcement. Verification of the teacher's verbal interaction was recorded on Flanders Interaction Analysis Code Sheets for both groups prior to the treatment and during the treatment.

Findings and Conclusions:

1. In one school, the achievement difference between groups proved significant at the .05 level in favor of the experimental variable.
2. An increase in favorable attitude towards the teacher and the course, based on pretest-posttest measures, was not found in the experimental classes.
3. Each teacher was able to reduce his use of punishing remarks (Flanders-category 7); whereas, individual teachers met with varying degrees of success in increasing their frequency of positive verbal reinforcement (Flanders-categories 2 and 3).
4. The effect of the observer in the classroom was found to contribute to a difference in achievement test scores in one school and noncontributory in the scores in three other schools.
5. Achievement test means of the experimental group were not significantly higher than the control group.
6. Differences between pretest and posttest measures of the experimental groups toward their teacher and course proved insignificant.
7. The four teachers were able to significantly reduce punishing verbal statements in their experimental classes. However, they varied in their ability to significantly increase their positive verbal reinforcement.
8. In one of the four schools there is reason to suspect that the observer's presence influenced the students' performance on the achievement measure.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Stanfield (Last name), Foster (First name), Ames (Middle name)

Exact Title A COMPARATIVE STUDY OF THE EFFECTIVENESS OF DRAFTING PROBLEMS RELATED AND UNRELATED TO STUDENT INTEREST

Degree granted Ed.D., Date 1971 No. of pages in report 134

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of the experiment was to study the effect upon students' learning and attitude of having drawing problems in drafting related to student interest. The null hypotheses for the study stated (1) that there was no significant difference in the relative effectiveness between the experimental and the control groups in (a) initial learning and (b) overall retention, and (2) that there was no significant difference in the attitude of students when taught by either type of instruments.

The investigation involved a comparison of the control group, learning drafting through the use of problems unrelated to student interest, and the experimental group, learning drafting through the use of problems related to student interest. Except for the drawing problems, the variable, the groups were presented the same material and instruction. The control and experimental groups were each composed of five first year high school drafting classes. The selection of experimental and control classes was done in a random method. It was assumed that the classes would be equated since students were programmed into them in a random fashion. That assumption was verified by analyzing the IQ scores and the scores of the pretest in drafting comprehension.

There were four units of instruction selected for the experiment: lettering, sketching, instrument drawing, and geometric construction. The criterion governing this selection was that they are the first four units taught to the first year drawing classes.

Data was obtained through two pretest, two post-tests, and unit tests. One pre- and post-test was a comprehensive examination on the areas of drafting covered during the study. The other pre- and post-test was an attitude inventory. Each unit test covered one of the units of instruction. The test scores were analyzed by two-way classification assuming equal numbers within rows.

Within the limits of the study, the null hypotheses were not rejected. The analysis of the collected data warranted the following conclusions:

1. There was no significant difference at the five per cent level in the relative effectiveness between the experimental and control groups in initial learning.

2. There was no significant difference at the five per cent level in the relative effectiveness between the experimental and control groups in overall retention.

3. There was no significant difference at the five per cent level in the change in attitude of students when taught by either the experimental or control instrument.

Order No. 72-5732, 134 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Stephenson (Last name), Donald (First name), John (Middle name)

Exact Title ACHIEVEMENT MOTIVATION AS A FACTOR RELATED TO THE DIAGNOSTIC PROBLEM SOLVING EFFECTIVENESS OF STUDENTS OF AUTOMOTIVE TECHNOLOGY

Degree granted Ed.D., Date 1970 No. of pages in report 158

Granted by University of Missouri -- Columbia, (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to ascertain the extent to which achievement motivation is predictive of diagnostic problem solving effectiveness. More specifically, the study was designed to ascertain the predictive value of achievement motivation as it relates to (1) diagnostic problem solving ability; (2) diagnostic problem solving knowledge; and (3) student attitude toward the course.

METHOD OF RESEARCH: A stratified four-group design was used in the investigation, which was conducted at Indiana State University, Terre Haute, Indiana, during the first semester of the 1969-70 school year. The data were gathered from students enrolled in three sections of IT 233 Basic Auto Mechanics, offered in the School of Technology.

Each of the sixty students were categorized in one of four groups representing varying strengths of achievement motivation following their simultaneous classification as high or low in Achievement and Test Anxiety. The students were also ranked and assigned to one of three strata on the basis of scholastic apititude scores, thus assuring the four research groups of being equated as closely as possible on scholastic ability.

The dependent variables of the investigation were measured at the conclusion of the course using three diagnostic problems selected from a simulator series, a thirty item multiple choice type examination, and a recognized attitude scale.

The two-way analysis of variance technique was utilized to test the effects of the variable, achievement motivation, upon the dependent variables, at each of the three levels of scholastic ability. Scheffe's *Test for Multiple Comparisons* was applied in all cases where the analysis of variance F-test revealed a significant difference.

CONCLUSIONS: Analysis of the diagnostic problem solving performance tests revealed that the research group which was highest in strength of achievement motivation was statistically superior to the group which was lowest in strength of achievement motivation on the problem solving performance variable. Significant differences were also found to exist between groups of differing scholastic ability. Both high and intermediate ability students were found to be superior to low ability students with regards to diagnostic problem solving performance.

The group which was highest in achievement motivation was also found to be superior to the group which was lowest in achievement motivation with respect to problem solving knowledge. It was further revealed that high ability students were statistically superior to low ability students on the diagnostic problem solving knowledge variable.

An analysis of both the attitude pretest and posttest scores indicated that there were no significant differences in attitude scores either between the groups which differed in strength of achievement motivation or between the three levels of scholastic ability.

Order No. 71-3384, 158 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author St. John (Last name), David (First name), Richard (Middle name)

Exact Title EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE

Degree granted Ph.D., Date 1971 No. of pages in report 126

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to ascertain: (1) the effect of a motion model on a learner's performance behavior and (2) the effect of the verbal description of the processes included in the demonstration upon a learner's performance behavior.

A total of forty-eight seventh grade girls were selected at random for participation as subjects in the experiment, which was conducted as a four-group controlled experiment. A 2 x 2 factorial design was replicated once using a posttest-only control group design. The independent variables for the study were: (1) movement, which was varied to include a motion and a static model, and (2) commentary, which was varied to include a verbal description of the processes and a silent condition.

The tasks chosen for the study were selected because they contained layout, holding, cutting, and assembly which are operations common to most industrial education activities. More specifically, the tasks chosen for the study were: (1) to cut and fasten two boards with a nail and (2) to fasten two boards with a woodscrew. A task analysis was used to identify hand and tool movements which were involved in the performance of the tasks. Rating scales were developed to measure the extent to which the subjects performed each of the tasks like the model which they had seen. A pilot study was used to train three raters in the use of the scales, to further refine the scales, and to set the criterion for the rating of each of the items.

Two instructional films were developed, one for each of the tasks. The motion version of each of the films was developed first showing all of the movements required in the performance of the tasks. A static version of each of the films was produced to present in sequential order all the steps required in the performance of the tasks. Each of the hand and tool movements was shown in the same manner in both versions of each of the films. The films were edited, and a script was prepared for use on a separately controlled audio tape recorder.

Video tape recording equipment was used to record the performance behavior of each of the subjects on each of the tasks. Each of the three raters viewed the recorded performances of each of the subjects on each of the tasks and rated them using the prepared rating scales. The rating scores for each subject were summed across the three raters to arrive at a single score for each subject on each of the two tasks.

A two-way analysis of variance was computed for each of the tasks. The analysis for task one failed to reveal a significant difference between the levels of movement. However, the analysis did reveal a significant difference between the levels of commentary in task one. On task two a significant difference was revealed for both the main effects of movement and commentary. No significant interaction effects were revealed for either of the tasks.

The following conclusions may be drawn relative to manipulative tasks of similar complexity to those used in this study.

Evidence provided by this research was not conclusive enough to state that movement in the visual demonstration of manipulative tasks will cause the learner to perform (imitate) hand and tool movements like those of a model. The effects of commentary in the demonstration of manipulative tasks were found to be consistent for tasks one and two. Therefore, it may be concluded that when a verbal description of the processes accompanies the visual demonstration of a manipulative task, the learners perform (imitate) significantly more like the model.

Order No. 72-10,658, 126 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Stuart (Last name), William (First name), Ralph (Middle name)

Exact Title ANALYSIS OF TWO YEAR ENGINEERING TECHNOLOGY CURRICULA ON THE BASIS OF EMPLOYER AND EMPLOYEE EXPERIENCES

Degree granted Ed.D., Date 1972 No. of pages in report 189

Granted by State University of New York (Name of institution), Buffalo, New York (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The opinions of newly employed technicians and their first line supervisors in industry were analyzed to determine the minimum technical employment curriculum requirements for the Mechanical Technology programs now offered at twenty-one public two year colleges of New York State. A composite of all curricula and course detail in the above programs and applicable current conceptual literature were used as a framework for data-seeking instruments. Information from respondents of nearly all 189 recruiting companies employing technician-graduates from all of the above units from 1967 to 1970 was compiled. In addition, intensive interviewing of 30 A.A.S. Mechnical Technology graduates and their first line supervisors at fifteen companies used for pre-testing revealed first employment and long term technical education needs.

It was concluded that most respondents felt that mechanical technologists are suitably employed at beginning job levels as befits their A.A.S. degree technical training. Misapplication of senior technologists' undergraduate training is possible since large numbers of engineers and "upper" management people may not be aware of the extent of such training. Further, while companies are spending increasingly more time at training A.A.S. degree graduates at their beginning jobs, industry indicates no desire for a broader based education with lesser emphasis upon technical specialties. It was further found that continuing college education is expected by technologists and fostered by employers. Lastly, it was found that technologists' first line supervisors were not aware of the declining numbers of high school applicants to the two year college technical programs, that they are willing to help extensively in recruiting efforts, but that they felt a strong need to participate as they had never before been asked, in the shaping of curricula.

The preparation of several tables was made possible which summarized the relative value of a wide range of technical courses to beginning jobs and also to long term professional needs. These tables show that drafting and machine tools, manufacturing processes and other basic technical courses such as strength of materials, analytical and fluid mechanics and basic computer concepts were much more important to technologists' beginning jobs than were traditionally important but highly specialized courses such as tool design, fluid power, numerical control machining, instrumentation and heat power and refrigeration. Further, it was found that these latter but significantly far less important courses, while not important to beginning jobs or the first year of employment, were judged by the respondents to be almost as important to long term needs as the previously important basic courses. Tables indicating extensively the values of all of the courses to beginning jobs and to long term employment needs will be of specific interest to persons responsible for technology curricula design.

Order No. 72-23,530, 189 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Stuteville, Claude, Edgar
(Last name) (First name) (Middle name)

Exact Title A STUDY OF THE EDUCATIONAL BACKGROUND AND SUBJECT AREAS TAUGHT BY INDUSTRIAL ARTS TEACHERS IN OKLAHOMA

Degree granted Ed.D., Date 1971 No. of pages in report 133

Granted by North Texas State University, Denton, Texas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The problem with which this study is concerned is that of determining the relationship between curriculum offerings in industrial arts and the academic preparation of industrial arts teachers in the public secondary schools of Oklahoma. The study utilized industrial arts teachers who were teaching in grades seven through twelve in Oklahoma. Also, the study was limited to those teachers who were graduates of an Oklahoma college or university.

The purposes of this study were the following: (1) to determine if the industrial arts teachers in Oklahoma have at least six semester hours preparation in the subject areas they were teaching; (2) to determine to what extent variations existed in the preparation of industrial arts teachers in the public secondary schools of Oklahoma; and (3) to determine the nature of industrial arts instruction in the Oklahoma public secondary schools.

Questionnaires were sent to 440 industrial arts teachers in Oklahoma. Of the 440 questionnaires that were sent, 247 usable questionnaires were returned and these provided data for the study. The questionnaire was selected as the instrument because of its economy and suitability for gathering data from a large population. Questionnaire content was guided by the statement of the problem encompassing primarily the individual teacher's educational background and the subject areas being taught.

The major portion of this dissertation was organized as a descriptive survey study. Information received about teachers' educational background and the subject areas being taught were tabulated, analyzed, summarized and interpreted.

The study led to the following findings and conclusions:

1. Of the 247 industrial arts teachers participating in the study, 215 held the standard teaching certificate, 234 had undergraduate majors in industrial arts, and only 13 or 5.27 per cent had undergraduate majors in a field other than industrial arts.

2. The academic preparation of industrial arts teachers was concentrated in the areas of woodworking and drafting.

3. Of the participating teachers 45.47 per cent considered woodworking a teaching specialty.

4. The greatest percentage, 43.92 per cent, had an assignment teaching woodworking. Of the 247 teachers 30.23 per cent had an assignment in drafting.

5. There were 55 teachers who had three years or less of teaching experience. The largest number, 54.84 per cent, had been teaching industrial arts for less than ten years, and over 10 per cent had been teaching industrial arts for over twenty-two years.

6. General Woodworking, General Drafting, and Machine Woodworking I, respectively, were the courses in which the majority of students in grades seven through twelve were enrolled.

7. General Woodworking, General Drafting and General Metals I were the three courses in which the majority of students in grades seven and eight were enrolled.

8. In grades nine through twelve, the three courses in which the majority of students were enrolled were General Woodworking, Machine Woodworking I, and Machine Woodworking II.

9. The courses included by the majority of the teachers in General Shop in grades nine through twelve were Woodworking, Drafting and Crafts.

10. The courses that were included by the majority of the teachers in General Shop II included Woodworking, Drafting, Metalwork, and Crafts.

11. In grades seven and eight, the courses most often included in General Shop were Woodworking, Drafting, Electricity, Leatherworking and Metalworking.

12. The majority of industrial arts teachers with assignments in General Shop taught the curriculum areas for a period of one week.

Order No. 72-4108, 133 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sullivan (Last name), Frank (First name), Victor (Middle name)

Exact Title AN EXPERIMENTAL STUDY OF THE EFFECTIVENESS OF TWO METHODS OF TEACHING ORTHOGRAPHIC PROJECTION IN TERMS OF RETENTION AND TRANSFER

Degree granted Ed.D, Date 1964 No. of pages in report

Granted by University of Illinois (Name of institution) Urbana-Champaign, Illinois (City State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To provide experimental evidence of the effectiveness of two methods of teaching orthographic projection in terms of the subject's ability to retain information learned or his ability to transfer to another drawing system.

Source of data and method of study:

The two methods used for the learning tasks were drawing systems which were both forms of orthographic projection. One method, termed traditional, utilized instruction in multiview orthographic projection followed by isometric drawing, while the other, termed "Eckhart axonometry," utilized isometric projection correlated with two or three multiview projections.

The methods, media and content of instruction, with the exception of the projection system, were the same for both groups.

Findings and Conclusions:

1. Experimental treatment A appearsto be more effective in terms of initial learning and retention than treatment B.
2. Use of treatment A may provide a better orientation to the principles of orthographic projection and thus allow the students to transfer to another drawing system based on the same principles with more ease than would a traditional treatment.
3. If evaluation instruments are to be used which do not contain a pictorial or isometric view the use of treatment A appears to allow the students to achieve higher scores and to transfer more easily to the traditional system.
4. The use of isometric views in problems enables the subjects to achieve a higher score than similar problems without the isometric view in both drawing systems.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Sundin, Robert Leo
(Last name) (First name) (Middle name)

Exact Title AN INVESTIGATION OF SELECTED TASKS THAT AFFECT JOB PERFORMANCE OF CRAFTSMEN AS PERCEIVED BY TRADE AND INDUSTRIAL EDUCATION TEACHERS AND EMPLOYERS

Degree granted Ed.D., Date 1971 No. of pages in report 150

Granted by University of Cincinnati Cincinnati, Ohio
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose. The purpose of this study was to identify selected tasks performed by employees on the job which directly affect job performance. Teachers in trade and industrial education programs and employers who have hired graduates from these programs participated in the study.

The Ohio Department of Education, Division of Vocational Education serves, assists in providing curriculum materials, in-service training and requirements and certification standards in order to upgrade to present vocational education program. Much of the emphasis has been directed toward teacher needs and improving the present in-service and pre-service teacher education program. This study was directed toward selecting and investigating tasks performed by teachers in trade and industrial education and tasks performed by employees on the job for the purpose of identifying those which affect job performance.

PROCEDURE

The method of gathering the information investigated in this study was the descriptive survey. Employers who have hired students from trade and industrial education programs and teachers in trade and industrial education high school programs participated in the study. A questionnaire was mailed to both groups of respondents which included a total of 110 tasks. Each respondent was instructed to indicate the level of importance for each task as it may job performance. Comparisons were made between the two groups in order to select those which directly affect job performance. A factor analysis was employed to assist in identifying tasks with common elements. Four preliminary tests were performed to determine an appropriate task listing for the investigation.

FINDINGS AND RECOMMENDATIONS

1. Performance tasks which are related to interest, attitude and motivation contribute significantly toward job performance of employees.

2. There is general agreement between employers and teachers in trade and industrial education programs upon those tasks which affect the job performance of employees.

3. Those performance tasks which fall in the category of leadership skills do not affect job performance of employees for those occupations included in the study.

4. Both groups agree that those tasks which require written communications or relay of information do not affect job performance.

5. Teachers rate those tasks in the area of leadership skills slightly higher in level of importance than employers rate them.

6. While there is much interest expressed in the need for advisory committees, most employers surveyed either are not presently serving on a committee or never have served on a committee.

7. Tasks which teachers and employers agree according to the affect upon job performance should be included in the instructional program as information that must be taught.

RECOMMENDATIONS FOR FURTHER RESEARCH

1. The populations presented in this study included teachers in trade and industrial education and employers. Additional research which would include students and graduates of the school programs would provide additional information which could be used to evaluate tasks which affect job performance.

2. A study, utilizing the leaders in trade and industrial education to determine the ideal frequency of teaching each task should be initiated.

3. A study should be conducted in order to clearly define job performance. Perhaps an appropriate study would reveal performance tasks which would contribute toward greater areas of authority and responsibility.

4. A study to determine those tasks which should be taught by teacher educators and those which should be taught by school supervisors or administrators should be investigated.

5. A study guide should be developed that could be utilized in the teacher education program that would include methods of teaching those tasks which contribute toward job performance.

6. A research study to determine the proper sequence of selected performance tasks to be included in a course of study in trade and industrial education should be investigated.

Order No. 72-2955, 150 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Tybie (Last name), John (First name), Paul (Middle name)

Exact Title A SURVEY OF DIFFERENTIATED STAFFING IN INDUSTRIAL EDUCATION

Degree granted Ed.D., Date 1972 No. of pages in report 459

Granted by Wayne State University (Name of Institution) Detroit, Michigan (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: Provide guidelines for experimentation in differentiated staffing by industrial educators, bases for identification of teacher roles and comparison of plans, and needed knowledge of the current trends in DS in public secondary schools.

Source of data and method of study: The research survey method was used. The literature was reviewed, the population identified, and two separate survey instruments were developed and administered to gather data about differentiated staffing practices at the secondary school level. Instrument No. 1 asked for information about new staffing arrangements from administrators. Forty schools were identified as meeting the criteria for this study. Instrument No. 2 elicited specific information about the involvement of industrial educators in the DS plans. Seventeen schools met this criterion.

Findings and Conclusions: Differentiated staffing provides an administrative framework which better facilitates extensive involvement in innovative educational practices; such as, team teaching; individualized, small-group, and large-group instruction; use of educational technology, and flexible scheduling. Chief reasons given for implementing DS plans were to facilitate individualized instruction and respond to individual needs of students and to make use of teacher time more efficient and flexible. Written descriptions for the various differentiated roles and training to specifically meet the needs and objectives of a differentiated staff program were essential to its success.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Tate (Last name), John (First name), Bruce (Middle name)

Exact Title A COMPARATIVE STUDY OF THE EFFECT INDUSTRIAL ARTS EXPERIENCES HAVE ON UNDERSTANDING THE FUNDAMENTALS OF DESIGN

Degree granted Ed.D., Date 1971 No. of pages in report 210

Granted by Texas A&M University (Name of institution), College Station, Texas (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this research was to determine statistically how design lessons relate to measured design judgment. The study was designed to test the following hypothesis. There will be a significant difference in the fundamentals of design acquired by tenth and eleventh grade students whose woodworking classes include design lessons and those students whose classes do not include design lessons.

The three hundred nine subjects of the study consisted of tenth and eleventh grade students in four high schools in Tulsa, Oklahoma. Three high schools were selected to be representative of various socio-economic sections of the city. The classes to be used were chosen by random selection, and the woodworking classes were divided into two groups. One group was taught design lessons by the use of lectures and transparencies, while the other group, along with selected drafting classes, received no special design lessons.

The Graves Design Judgment Test was made into equivalent forms for a pre-test and a post-test. The pre-test was administered to all the students in the experiment. The ten design lessons were taught to one group of woodworking classes in each school by the regular woodworking teachers. The post-test, an achievement test, and a questionnaire were administered to all the students in the experiment.

The pre- plus post-test scores, achievement test scores, and the post-minus pre-test scores were compared with the socio-economic variables for each student. These variables were family income level, Differential Aptitude Test scores of spacial relations, numerical reasoning, mechanical reasoning, grammar, abstract reasoning, spelling, and verbal reasoning, student's age, student's school level, museum visits, father's school level, and number of student's junior and senior high school shop classes. In comparing the test scores with the variables it was found that there was no consistent relationship between the test scores and the variables.

A correlation study was done to analyze the test scores and the variables. There was very little correlation between the various test scores or the test scores and the variables. The highest correlation found in the study was a .4138 between mechanical reasoning and the pre- plus post-test scores.

An analysis of variance was made to test the significant differences among the schools, teachers, and treatment. An analysis was made for the pre- plus post-test scores with the twelve combinations. There were significant differences at the .001 level. When only one teacher in each school was considered, the differences were not significant. The results at one school are the same as the other schools if the same teacher was involved in both treatments. An analysis of variance was made of the post- minus pre-test scores and the twelve combinations. The analysis showed significant differences at the .001 level.

The result of the experiment is that the hypothesis can be accepted for students in all schools if the data is based on the achievement test scores but rejected at schools one and three if the data is based on the Graves Design Judgment Test.

Order No. 72-9701, 210 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Taylor (Last name), Frank (First name), Crowder (Middle name)

Exact Title AN ANALYSIS OF THE UTILIZATION OF THE RESOURCES INVESTED IN INDUSTRIAL TECHNICAL EDUCATION AT THE SECONDARY LEVEL IN THE NORTHEAST OF BRAZIL

Degree granted Ed.D., Date 1970 No. of pages in report 170

Granted by Columbia University, (Name of institution) New York City, New York (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

As demand for education and the costs of providing schooling rise, planners have become increasingly aware of the necessity to better utilize the resources invested in education so as to increase the quantity, quality, and economic value of the graduates of the system. Industrial technical high school systems in developing countries have been particularly criticized for their high costs and low effectiveness in training the middle-level technicians so essential to industrial development and to economic growth.

The objective of this study was twofold: (1) to identify the economic costs of educating and placing middle-level technicians in industry in the Northeast of Brazil with present and with "full" internal and external resource utilization of the technical high schools and (2) to show the cost implications of achieving the output of graduates forecasted by Brazil's manpower plan with a continuation of present underutilizations of resources. Internal resource utilization was measured in terms of enrollment capacity, teacher utilization, and student flow, and external utilization was measured in terms of graduate employment. "Full utilization" of resources was that defined by the standards officially set by the system for each of these measures.

The per-pupil budgetary costs of technical education were seen to be about five times that of academic education at the same level, yet in both types of schools personnel costs were at least 80% of the total expenditures. Economic costs (including private and public indirect costs) in both the academic and industrial schools were about twice the budgetary costs. Total economic costs were very sensitive to alternative assumptions of the value of capital charge and forgone earnings, especially the latter.

It was found that the enrollment of the industrial schools was on average only 50% of their standard enrollment capacity and that generally "full enrollment" could have been achieved by requiring instructors to teach the number of hours for which they were actually hired. Per-pupil budgetary costs with full teacher utilization would have fallen approximately 40% and economic costs would have decreased about 35%. It was also determined that, as a result of existing student drop-out and repetition, per-graduate economic costs were generally double those possible with perfect student flow through the system.

A follow-up study of technical school graduates of 1965 and 1966 showed that only about 35% of them were into industrial employment as technicians and that those in industry were already studying or soon planned to upgrade themselves to the engineer level. Consequently, the unit costs of obtaining the desired standard of man-years of technicians in industry from the technical schools becomes astronomical, in one of the schools as much as 2,000% above the hypothetical costs with full utilization and over thirty times the per-graduate cost of academic secondary education.

If Brazil's Plan targets of technicians in industry for 1970 were to be fulfilled with existing patterns of resource utilization, enrollment in the first year class of the technical schools would have had to be tripled in 1967 and an extraordinary burden placed on the budget for secondary education. A number of strategies were recommended for increasing the utilization of the resources of the technical high school system which should lead to substantial savings of resources that could then be devoted to a general expansion and improvement of the entire secondary education system.

It is recognized that the study was based on a very limited sample of technical schools in Brazil. Nevertheless, the methodology proposed for analyzing the cost implications of resource utilization of technical schools should be useful in identifying the range of cost savings possible with increased productivity in any educational or training system.

Order No. 71-14,337, 170 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Terry (Last name), Thomas (First name), Phil (Middle name)

Exact Title CHARACTERISTICS OF STUDENTS, INSTRUCTIORS, AND THE CURRICULUMS OF ENGINEERING-RELATED TECHNOLOGIEDS IN MISSISSIPPI PUBLIC JUNIOR COLLEGES

Degree granted Ed.D., Date 1972 No. of pages in report 208

Granted by Mississippi State University (Name of institution) State College, Miesissippi (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The Problem

The purpose of this dissertation was to study the characteristics of the students, instructors and the curriculums of engineering-related technologies in the public junior colleges of Mississippi to gain information and to suggest possible improvements.

Procedures

The data relative to the curriculums were obtained from catalogues and brochures of the participating junior colleges. A questionnaire was employed to secure information regarding students and instructors. Seventy-eight per cent of the students and 90 per cent of the instructors responded.

An analysis of the data relative to student characteristics was made by employing the chi square test. This was done by cross tabulating the reported grade point average with each of the 75 variables on the questionnaire.

Summary

The Student. The following biographical description was found significant in the identification of a successful student:

The average successful student was between 22-24 years old, married, and had no children. He was a veteran, first-year student who commuted 26-30 miles to attend classes.

In meeting the costs of his education, the student received no appreciable support from his parents and less than one-half from his spouse.

This student had an "A" average for his high school work and often participated in athletic and social clubs. He made a score in excess of 20 on the American College Test.

This student indicated that plane geometry and general science taken in high school were of much value in preparing him for technical education.

The Instructors. During the 1970-71 school year, 69 instructors were employed by the public junior colleges in Mississippi.

The median education of these instructors was a bachelor's degree. Three out of every 4 instructors who had earned the bachelor's and master's degrees received them from colleges and universities in Mississippi.

The majority of the instructors taught 9-12 students per class. The typical instructor taught 16-18 semester hours per term which resulted in 21-23 student contact hours per week.

Fifty-seven of the 62 instructors had at least one year of industrial work experience prior to their first teaching assignment. The largest single group had 10 or more years in closely related work experience.

The majority of the instructors had 3 years of technical experience. Only 4 were found to be first-year instructors during 1970-71, and 50 per cent of the total indicated 5 years or more of teaching experience.

The Curriculums. Technical curriculums were listed by each of the 11 public junior colleges in Mississippi. A composite list of the 36 programs offered in these 10 junior colleges was classified under 5 main curriculum areas.

The mean average requirements of the 36 curriculums were:

1. A total of 71 semester hours for completion, composed of the following:
   a. Thirty-one semester hours of technical specialty courses.
   b. Six semester hours of mathematics courses.
   c. Six semester hours of science courses.
   d. Ten semester hours of auxiliary supporting courses.
   e. Eighteen semester hours of general education courses.
2. A total of 1,660 student contact-hours, composed of the following:
   a. Seven hundred ninety-seven contact-hours of technical specialty courses.
   b. One hundred sixteen contact-hours of mathematical courses.
   c. One hundred sixty-six contact-hours of science courses.
   d. Two hundred sixty-six contact-hours of auxiliary supporting courses.
   e. Three hundred fifteen contact-hours of general education courses.

Graduation from high school was the prevalent admission requirement. A majority of the colleges required successful completion of 64 semester hours for graduation with an honor point ratio of 2 (C average).

Order No. 72-20,276, 208 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Thomas (Last name), Henry (First name), Lee (Middle name)

Exact Title THE METALS UTILIZED FOR INSTRUCTION IN INDUSTRIAL ARTS TEACHER TRAINING PROGRAMS COMPARED WITH THE METALS USED IN METALWORKING INDUSTRIES

Degree granted Ed.D., Date 1971 No. of pages in report 175

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of Problem

The primary purpose of this study was to find the extent to which the metals taught in industrial arts teacher training institutions are representative of present and future industrial metal utilization practices. The secondary purposes were to determine:

1. Methods used to present metal material information in the industrial arts teacher preparation metals programs.
2. Reference sources used by teacher education instructors to discover new metals information.
3. Instructional methods used to present metal material information in industrial arts teacher preparation curricula.
4. Monetary provisions available for student investigation or experimentation with new metals.

Procedure

The data used in this study were derived by means of two questionnaires containing identical listings of 107 specific metals. The industrial questionnaire was sent to 297 metalworking firms randomly selected from the six metalworking categories presented in *Dun and Bradstreet Middle Management Directory*, 1971 edition. The educational questionnaire was sent to all 198 institutions that offered a Bachelor's Degree in Industrial Teacher Education and that were listed in the 1970-71 *Industrial Teacher Education Directory*. The data obtained from the two populations were compared for significance through a chi square statistic at the .01 level of significance. Frequency rank orders of metal use by each population were also compared.

Conclusions

The following conclusions were drawn from an interpretation of the compiled data.

1. Industrial arts teacher training institutions were only partially interpreting current and future industrial metal consumption practices.
   a. If education is to project a current interpretation of industrial metal consumption, all industrial arts teacher preparation curricula should include the eleven most industrially used metals. These metals were: low carbon steel, medium carbon steel, high carbon steel, low alloy steel, oil hardened tool steel, high speed tool steel, air hardened tool steel, gray iron, copper, cast aluminum, and solder.
   b. The major aspects of metals were not being taught with equal emphasis. Physical and chemical characteristics and industrial applications of metals were most often taught while mill conversion and refinement, mill production, classification systems, and student project applications were given the least emphasis by metals instructors.
   c. The projected industrial use of metals was not consistently reflected in the metals curricula of teacher training institutions. Examples included titanium alloy, powder metals, and stainless steels which were projected to have extensive future industrial use but were receiving little attention in the teacher training curricula.
2. Teacher training institutions were deriving metal information primarily from such secondary printed sources as textbooks and professional and technical periodicals. With the time lag inherent in printed information, the relationship between current industrial practices and the present metals curricula could be challenged. Increased application of primary information sources such as industrial advisory councils, technical seminars, and the industrial employment of teacher educators would provide first hand information to strengthen the metals curricula.
3. With lecture and assigned reading the dominant instructional methods used in teacher training institutions, the future teacher has little opportunity to develop independent metal information gathering techniques necessary for the maintenance of a current industrial arts program.
4. More emphasis by industrial arts teacher educators needs to be given to student experimentation and research with new metals. Sixty per cent of the institutions reported no funding available for this purpose. *Recommendations for Further Study*
1. An in-depth study should be conducted to explore the need for and ramifications of student investigation and experimentation in the material areas.
2. A study should be conducted to determine the extent to which the industrial arts curricula are interpreting other contemporary industrial materials such as ceramics and composite materials.
3. A feasibility study should be conducted to determine the need for and techniques of providing a metal material in-service training program to teacher education metals instructors.

Order No. 72-23,823, 175 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Thompson (Last name), Bruce (First name), Le Roy (Middle name)

Exact Title THE STATUS OF COMMUNITY-JUNIOR COLLEGE INDUSTRIAL ARTS PROGRAMS FOR LOWER DIVISION REQUIREMENTS IN FOUR-YEAR INSTITUTIONS IN CALIFORNIA

Degree granted Ed.D., Date 1971 No. of pages in report 268

Granted by University of California-Los Angeles (Name of institution) Los Angeles, California (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem: The greatest single influence on the programs of teacher preparation in industrial education in the years ahead is the expanding growth of technical programs in the community-junior colleges throughout the country. A comparison of course offerings and requirements of community-junior colleges and four-year institutions indicates the need to articulate and coordinate technical education preparation courses, and the need for a development of pre-industrial teacher curriculum for prospective industrial arts teachers.

Little research has been conducted which assesses the current status of community-junior college industrial arts programs for lower division requirements in four-year institutions in California. Investigation was needed to identify similarities and differences within these programs. The purpose of this study was to 1) ascertain the current status of industrial arts programs in California community-junior colleges and 2) assess program effectiveness within the design of survey research.

Method of Procedure: The programs selected for this study included all industrial arts programs in California community-junior colleges. The total number of community-junior college programs in the state identified those schools which did not offer industrial arts programs. A survey of California institutions of higher education that provided lower division industrial arts teacher preparation programs helped the investigator to analyze course offerings of California community-junior college industrial arts programs as lower division requirements in the four-year institutions.

The methodology for this study included three steps within the operational plan of status survey research design. First, the investigator specified the problem, selected the programs to be studied, and used printed information to gather the data. Next, the data was collected, coded, and tabulated. Finally, the results were interpreted and reported.

Principal Findings: Optimum community-junior college industrial arts programs for lower division requirements in four-year institutions in California should include the following elements:

1. Community-junior college representatives should correspond with four-year institution representatives in California to evaluate basic industrial arts course contents for equivalency and unit value for the students majoring in industrial arts.
2. More California community-junior colleges should offer industrial arts transfer programs to four-year institutions offering industrial arts teacher preparation programs.
3. Information bulletins concerning occupational planning, major and minor requirements, and four-year institution degree requirements should be developed for the community-junior college industrial arts transfer students.
4. In-service industrial arts education programs should be developed for instructors in both the California community-junior colleges and four-year institutions to upgrade and articulate the industrial arts programs.
5. Many community-junior college technical courses should be given a dual purpose and carry an "industrial arts" prefix if these courses meet four-year institution requirements.
6. More concentration should be given to expand the basic industrial arts courses offered in the California community-junior colleges.
7. Orientation course materials on industrial arts education should be included in more of the community-junior college curricula.
8. Advisory committees composed of both community-junior college and four-year institution personnel should be established at the four-year institutions to articulate and plan basic industrial arts course content descriptions.
9. The basic industrial arts course content descriptions should be planned, articulated, and implemented between community-junior colleges and four-year institutions throughout California.

Order No. 72-13,658, 268 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author THOMPSON (Last name), GUERN (First name), KARL (Middle name)

Exact Title A Study of New Teacher Induction Practices in the Cedar Rapids Community School District

Degree granted Ph D, Date 1971 No. of pages in report

Granted by University of Iowa (Name of institution) Iowa City, Iowa (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )
University Microfilms, Ann Arbor, Michigan

Purpose of Study:

Source of data and method of study:

Findings and Conclusions:

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Thorpe (Last name), Claiburne (First name), B. (Middle name)

Exact Title STATUS, RACE, AND ASPIRATIONS: A STUDY OF THE DESIRE OF HIGH SCHOOL STUDENTS TO ENTER A PROFESSION OR A TECHNICAL OCCUPATION

Degree granted Ph.D., Date 1968 No. of pages in report

Granted by New School for Social Research (Name of institution), New York, New York (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To compare students of different races and social classes with regard to three variables; occupational aspirations; knowledge of educational requirements for occupations they hoped to enter; knowledge of income they could expect in these occupations.

Source of data and method of study·

This study is based on a written questionnaire administered to white and Negro high school students in North Carolina.

Findings and Conclusions·

1. The study showed differences in aspirations between white and Negro students as well as between students in different social classes which were to be anticipated on the basis of previous research.
2. The study did bring out one significant variable not adequately tested in previous research: the effects of sec-role differentiation in different sub-cultures as they affect the occupational aspirations of high school youth.
3. The study found that Negro lower class girls had higher occupational aspirations and tended to be more realistic in their estimate of these occupations than the other three lower class groups in the sample.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Tift (Last name), Katherine (First name), Fischer (Middle name)

Exact Title IDENTIFYING INSTRUCTIONAL TASKS FOR PREPARING INDIVIDUALIZED LEARNING EXPERIENCES IN RADIOLOGIC TECHNOLOGY

Degree granted Ed.D., Date 1971 No. of pages in report

Granted by The George Washington University (Name of institution) Washington, D.C. (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To develop one component (a task inventory) of one part (individualized instructional activities) of one subject (preparing radiologic technologists) in one curriculum (health career program) of one branch of higher education (two-year college) which in turn was a sub-system of a state's network of school systems.

Source of data and method of study

A list of 46 tasks which were designed to be neither so general they were meaningless, nor so detailed they were unmanageable, was developed with the functional stages of an instructional system being used for the organizing element.

The procedures followed were adapted from validated methods of conducting a job/task analysis that met the time, cost, and manpower constraints imposed upon this study. The inventory was refined from a draft stage to a preliminary stage to a final stage. This final inventory was submitted to a nationwide list of radiologic technology instructors at two-year colleges and to a national panel of instructional systems experts who agreed to assess the validity of each task statement. The data received were organized and analyzed to draw conclusions and make recommendations.

Participants numbered 26 in the instructors' group and ten in the experts' group. The 36 respondents returned an acceptance of 80 percent or above for all of the 46 task items in the inventory, and 86 percent or above for 43 of them.

Findings and Conclusions:

1. It is possible for one person to create a validated inventory of instructional tasks inherent in preparing and managing a technical program in a community college: the procedures researched and developed for this study provide an operational model for educators to use in developing their own task lists as the seek to individualize their instructional activities.
2. Validation for a task list utilizing a systems format can occur when responses are given by respondents whose members have expertise in the inventory's subject or in its design, but not necessarily in both areas.
3. Standardized terminology for the subject of systems in education does not yet exist.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Timper (Last name), Hans (First name), Edward (Middle name)

Exact Title CHARACTERISTICS OF SELECTED INDUSTRIAL EDUCATION TEACHERS IN RELATIONSHIP TO BARRIERS TO CURRICULUM CHANGE

Degree granted _____, Date 1972 No. of pages in report 145

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: The purpose of this study was to analyze data pertaining to selected characteristics of industrial education teachers and to relate this data to barriers to curriculum chage.

Source of data and method of study: Research instruments were sent to 300 randomly selected industrial education teachers at the public high school level in the four corner states of Arizona, Colorado, New Mexico, and Utah. Stepwise multiple regression was used to establish a model for the prediction of a profile of the industrial education teacher who is resistant to curriculum change.

Findings and Conclusions: The teacher who is resistant to curriculum change has the following characteristics as established by the model: (1) Divorced, separated, or widowed (also, single is more inclined to be resistant than married); (2) Minimum amount of professional preparation; (3) Minimum amount of occupational experience; (4) Has been employed in large number of school systems; (5) Majority of teaching experience at other than the junior or senior high school (also, senior high is more resistant than junior high); (6) Actively seeks out outdoor activities; (7) Low annual teaching income; (8) High annual total income.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Tobin (Last name), Gerald (First name), W. (Middle name)

Exact Title THE STATUS OF INDUSTRIAL EDUCATION IN MINNESOTA HIGHER EDUCATION WITH COMPARISONS TO A THEORETICAL MODEL

Degree granted Ed.D., Date 1972 No. of pages in report 155

Granted by Utah State University (Name of institution) Logan, Utah (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

The purpose of this study was to collect needed information concerning the present status of industrial education and to develop a model for the purpose of recommending to the Minnesota Higher Education Doordinating Commission the necessary changes that would allow for better coordination of industrial education programs and improved interinstitutional and intersystem cooperation.

Source of Data and Method of Study:

Data was obtained from a mailed questionnaire, a program inventory of Minnesota Higher Education, and semi-structured interviews with five administratárs of Minnesota Higher Education. A theoretical model was developed and then evaluated by the five administrators and a panel of experts.

Findings and Conclusions:

The program inventory showed that the undergraduate major fields of study were spread relatively well throughout the state. Higher education coordination was preceived by teachers in the field as being inadequate. A favorable amount of cooperation was found to exist amoung teachers within each of the four systems of higher education. Little cooperation existed across systems lines, especially between the area vocational-technical institutes and the state junior colleges.

Conclusions:

1. Generally, industrial education is well-represented in the state of Minnesota.
2. Many industrial education programs were narrow and shallow in the junior state colleges.
3. More information is needed by teachers in the field concerning the teaching act.
4. Improving public relations is high on the priopity list of teachers in the junior state colleges.
5. Most of the reasons for communication between the four systems of Minnesota higher education were for the upgrading of professional competence.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & AAITTE

Author Tomlinson, Robert, Morris
(Last name) (First name) (Middle name)

Exact Title A COMPARISON OF FOUR METHODS OF PRESENTATION FOR TEACHING COMPLEX TECHNICAL MATERIAL

Degree granted Ed.D., Date 1962 No. of pages in report

Granted by University of Illinois, Urbana-Champaign, Illinois
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To obtain research evidence in a school learning situation of the relative effectiveness of four method of presenting a complex technical material in written form.

Source of data and method of study

The three basic conditions that defined the methods were: a) inductive-deductive, b) discovery-reception and c) intratask organization. These were varied to provide the four methods: a) inductive, b) inductive-discovery-confirmation, c) deductive, and d) inductive-discovery.

The material used consisted of a 3,300 word passage drawn from the area of the metallurgy of carbon steel. The task was conceived to be complex, consisting of technical material requiring a high level of cognitive ability due to the inclusion of interdependent, changing and fixed facts, definitions, different types of principles, and generalisations all of which applied simultaneously.

Findings and Conclusions:

1. The inductive method is superior to all other methods and the inductive-discovery method is superior to the inductive-discovery-confirmation method for initial learning when measured immediately.

2. All investigated method are equally effective when success is measured in terms of retention and transfer at on week after instruction.

3. 3. The inductive-discovery-confirmation method is inferior to all other methods when success is measured in terms of retention and transfer at five weeks after instruction.

4. An expository method, induction or deduction, stating the generalisations is superior to the methods including questions to stimulated the student to form his own generalisations when success is measured by retention and transfer at five weeks.

5. There is no differential advantage in using any one method, in preference to another, for a particular ability level or class.

6. At five weeks after instruction, students retain and transfer continuous principles to a higher degree than discontinuous or inverse principles, and further, they impose a continuous interpretation on data to which discontinuous and inverse principles apply.

7. Achievement, measured on initial learning and on retention and transfer varies to a degree, with the type of measure employed.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Tosh, Donald James
(Last name) (First name) (Middle name)

Exact Title EFFECTS OF AN INTRODUCTION TO VOCATIONS COURSE ON THE VOCATIONAL DEVELOPMENT OF NINTH GRADE STUDENTS

Degree granted Ed.D., Date 1971 No. of pages in report 88

Granted by Lehigh University Bethlehem, Pennsylvania
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine the effects, if any, of a state-sponsored Introduction to Vocations course on the vocational development of ninth grade students in the areas of occupational knowledge, vocational attitudes and career development knowledge. In addition, a follow-up study of 100 high school graduates who experienced the course in 1965 and 100 high school graduates who did not experience the course in 1965 was conducted to determine job satisfaction.

In October of 1969, 469 ninth grade students were selected to test the hypotheses set forth by the investigator. The hypotheses were:

1. Those students enrolled in the Introduction to Vocations course would have more occupational knowledge than those students not enrolled in the course.
2. Those students enrolled in the Introduction to Vocations course would have a more vocationally mature attitude than those students not enrolled in the course.
3. Those students enrolled in the Introduction to Vocations course would have more knowledge and understanding of the career development process than those students not enrolled in the course.
4. Those high school graduates who experienced the Introduction to Vocations course are more satisfied with their jobs than the high school graduates who did not experience the course.

The experimental group consisted of 231 ninth grade students and the control group was comprised of 238 ninth grade students selected on the basis of age, grade level, and the range of normal intelligence (90-110). All subjects were pretested and posttested with the following tests: *The Test of Occupational Knowledge, Attitude Scale, Form IV,* of the *Vocational Development Inventory* and the *Guidance Inquiry Test.* The *Job Satisfaction Blank Z5* was used to gather the data in the follow-up study.

The data collected were processed by the statistical technique of analysis of covariance. Each of the three posttest measures was analyzed with the pretest scores and intelligence scores as the covariates. The chi square test was used to test for significance in the follow-up study to determine job satisfaction.

The means for the control group of the three posttests (i.e., occupational knowledge, vocational attitudes and career development knowledge) when adjusted for respective pretest and intelligence scores were slightly higher than the means for the experimental group given comparable adjustments. However, examination of the unadjusted pretest means and the unadjusted posttest means revealed that the experimental group had a slightly higher gain in its unadjusted means than did the control group. It would appear that the course may be having some positive effects even though there were no significant differences found in the analysis of covariance using the intelligence scores and pretest scores as the covariates and the posttest scores as the dependent variable. Also, the high school graduates who experienced the course in 1965 were no more satisfied with their jobs than the high school graduates who did not experience the course. In addition, the findings of the follow-up study of the high school graduates revealed a definite similarity between the two groups of graduates in the number of college credits earned while employed full time, their involvement toward, income earned, [illegible] differences of career choice and job stability.

The results obtained in this study indicate that in the areas of occupational knowledge, vocational attitude, and career development knowledge, the presumed increased benefits do not appear to be forthcoming under present conditions. Several possible explanations exist. It may be that the scope of the study was not broad enough or that there are distinct benefits that accrued to the students other than those upon which the study focused; attitudes and preparation of the professional staff may also be heavily reflected in the results obtained. However, these possible explanations do not alter the fact that the specific benefits investigated in this study did not emerge and that the hypotheses, consequently, were not sustained.

Order No. 72-9513, 88 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Shelsher, Sandra, D.
(Last name) (First name) (Middle name)

Exact Title UNDERGRADUATE ADMISSION POLICIES OF COLLEGE AND UNIVERSITIES IN THE UNITED STATES WITH IMPLICATIONS FOR VOCATIONAL EDUCATION

Degree granted Ph.D., Date 1971 No. of pages in report 220

Created by University of North Dakota Grand Forks, North Dakota
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The problem of this study was to determine undergraduate admission policies in four year colleges and universities of the United States. Quantitative and qualitative criteria for admission policies were compared, and there was special emphasis on whether high school vocational units were accepted for admission.

A questionnaire was developed and mailed to the Directors of Admissions for the total population of four-year colleges and universities listed in the *Education Directory, 1969-1970 Part 3, Higher Education*. The findings of the study were based on the data from the respondents. Each questionnaire was classified according to control, accreditation, structure, size, and region of institution.

Transcript of grades was rated almost unanimously as the most important undergraduate admission criteria. This was followed by rank in graduating class, principal's recommendation, standardized test scores, health record, and personality record. Added importance was given to the personal interview, other recommendations and extra-curricular activities when the applicant was a doubtful candidate for admission. In evaluating the transcript of grades, the majority of the respondents allocated credits in terms of units of preparation in the high school program. In general the included four units of English, two units of foreign language, two units of mathematics, one to two units of science and two units of social science. The institutions preferred to evaluate grades D through C. Differentiated admission criteria was frequently established for in-state, out-of-state, foreign, and minority students.

The respondents were reluctant to give minimum cutoffs for grade-point average, rank, and standardized test scores as these were frequently weighted in an admission formula and not used independently. The majority of respondents expected applicants to rank in the top 50 per cent of the graduating class. The admission officers preferred the high schools use the method of ranking the academic courses only and excluding all students.

Vocational electives were accepted on the high school transcript by one of every two respondents. Business and office education was the most widely accepted high school vocational elective. This was followed by home economics, industrial arts, distributive education, agriculture, trade and industry, and work experience. A trend was evident of accepting three units of electives in vocational specializations. Five of every six respondents indicated they would not differentiate between applicants with academic and vocational electives. Four of every six respondents gave preference to applicants with academic electives.

Six special undergraduate admission policies were found. These included (1) advanced placement with credit, (2) provision for those who do not meet all the admission requirements, (3) special admission for those over 21 who do not meet the admission requirements, (4) advanced placement without credit, (5) provision for those who are qualified to challenge college courses, and (6) early admission for gifted high school students. The most prevalent advice given to students who did not meet the admission requirements was to apply to a community or junior college.

Although there was a growing trend to open admission policies, the majority of institutions still require or recommend a pattern of high school preparation. It is recommended that college and university deans' admission criteria be based on the pattern of high school preparation. Other recommendations included: (1) Vocational course should be included in the curriculum of students, (2) Advanced placement credit should be developed for senior college-level vocational courses, (3) Opportunities should be available for applicants to challenge college courses in the vocational areas, (4) Less emphasis should be placed on the standardized admission tests, (5) The high school principals and counselors should give due attention to the recommendations they write for students. Further research should be done on the importance of the personal information of candidates in the admission policies of the college and universities.

Order No. 72-8008, 220 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITE

Author Ellery, James, William
(Last name) (First name) (Middle name)

Exact Title A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS

Degree granted Ed.D., Date 1971 No. of pages in report 197

Granted by University of Illinois at Urbana-Champaign, Urbana, Illinois
(Name of institution) (City State)

Where Available: Microfilm (y) Microfiche ( ) E.R.I.C. ( )

OBJECTIVES. The exploration of student selection and cooperative work education (CWE) program operation required correlated and investigation objectives. The major and subordinate objectives were:

1. Devise a method for the identification and study of groups of students excluded (overtly or covertly) from vocational education CWE programs as the result of a) program organization and operation, b) administrative procedures and practices, and c) student selection criteria and practices.
2. Devise an analytical technique using selected characteristics to compare student admitted to CWE programs with those excluded (or not included).

A subordinate objective was the specification of selected student characteristics (having or some commonly) and selected studies readily available to school personnel) relevant to groups to be served by CWE according to national goals, priorities, and problems, and contributory to the accomplishment of the objectives of the study.

3. Conduct an assessment of a local school system's CWE program including its student selection criteria and practices. Determine the extent to which, a) its operation and selection criteria and practices, the program was a) congruent with school system policy and b) responsive to national goals, priorities, and problems relative to the Vocational Education Act of 1963 and the Amendments of 1968 to the Vocational Education Act and to goals stated in the current literature.

A subordinate objective was to conduct an in-depth analysis of selected high schools, or an urban community, and a cross of the socio-economic characteristics of two student bodies to describe selected characteristics of a student group admitted to CWE, and b) those groups not admitted (including those for whom no job assignment was available).

CONCLUSIONS AND FINDINGS. The characteristics of students excluded overtly or covertly from the school system's CWE programs strongly suggest that many students were denied admission to CWE on the basis of such factors as socio-economic class, race, age, etc. Despite pressures, the school attainment, absences, and grade or class factors. Comparative consideration of these factors points to the acceptable conclusion that those CWE students so defined for the purpose of the study fit the description of the population generally designated for priority assistance in terms of national goals and priorities, and the population most specifically in need of the kind of help which can be provided by CWE and vocational education. The concern of the schools, parents can be used was more precisely student are excluded from CWE by the very criteria that should be used to select them for these programs. Students for whom the CWE and other special vocational education programs are intended and who have the ability to serve, are clearly screened out in the selection process, whether by selection procedures that are inappropriate or by practices that appear invalid, biased.

The central goal of the state agency with its responsibility to offer equal opportunity for vocational education, implied from the findings and conclusions of the most recent (1970) report of the National Advisory Council on Vocational Education, the methodology and findings of the study would appear to be of current interest and of more than local significance and success.

(Order No. 72-7990, 197 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Van Brocklen, Raymond C.
(Last name) (First name) (Middle name)

Exact Title POLICIES AND PRACTICES IN THE RECRUITMENT, SELECTION, AND TRAINING OF TRADE AND INDUSTRIAL EDUCATION TEACHERS IN NEW JERSEY

Degree granted Ed.D., Date 1971 No. of pages in report 225

Granted by Rutgers University, New Brunswick, New Jersey.
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

STATEMENT OF THE PROBLEM

This study was designed to describe current practices of recruitment, selection, and training of trade and industrial education teachers in New Jersey, and to present recommendations for changes in these practices as suggested by selected administrators of vocational-technical education of New Jersey and in light of the certification standards of all states and the policy or position statements of national organizations concerned with the recruitment, selection, and training of trade and industrial education teachers.

METHODOLOGY

Forty-eight administrators of vocational-technical education in New Jersey were personally interviewed through the use of a tested interview schedule resulting from a review of the literature to determine present practices, and to secure recommendations for changes in these practices. Furthermore, directors of vocational education in all the states were asked to provide their certification standards, and national professional organizations were requested to submit their policies regarding the recruitment, selection, and training of trade and industrial education teachers.

Percentages of responses of the administrators of area vocational-technical schools in New Jersey were determined, replications were drawn and compared with the certification requirements of the other forty-nine states, and with the policies of the professional organizations.

FINDINGS

The present practices of recruitment and selection in New Jersey were based upon a variety of sources for T & I education teachers. The basic requirement for each teachers was competency in their occupations. Screening procedures involved interviews and recommendations of former employers. Most salary decisions were based upon length of occupational experience. In-service training was provided by most of the districts.

Recommendations by New Jersey administrators for changes in these practices were: utilization of trade competency tests in the recruiting-selecting process, establishment of a state-wide registry of T & I teachers, provision of pre-service training to newly-appointed T & I teachers, addition of human relationship studies to teacher-preparation curricula, changes in training programs, retention of present New Jersey certification standards and initiation of a national certification standard, appointment of T & I teachers early in the spring, involvement of industry to assist in providing in-service training, utilization of trade competency tests to determine college credit awards to T & I teachers, and awarding of college credits for trade or industrial experience.

New Jersey is not unique in certification requirements. Present practices are generally similar in most states. The recommendations given for trade competency tests, early appointment of T & I instructors, and granting of college credits for experience are carried out in various states at the present time.

Replies from the national organizations were not adequate for comparison with the other findings.

IMPLICATIONS

Implications resulting from this study included:

1. Practices of recruitment and selection of T & I education teachers in New Jersey should be revamped, beginning on the state level and should involve colleges and school districts.

2. T & I teacher education should be reviewed in light of the study. Closer school-college liaison, more curriculum, based courses, and the needs of the individual teacher should be stressed.

3. College credit for equivalent work experience should be awarded to T & I teachers matriculating for degrees.

4. General school administrators should become better informed regarding vocational-technical education.

Order No. 72-8,801, 225 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Vander Linde, Albert, _____
(Last name) (First name) (Middle name)

Exact Title EMERGING MODELS FOR FINANCING AREA VOCATIONAL TECHNICAL SCHOOLS

Degree granted Ph.D., Date 1971 No. of pages in report 190

Granted by Colorado State University, Fort Collins, Colorado
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The purpose of the study was to investigate and record the methods utilized in financing post high school vocational and technical education in the United States.

A mail survey sent to the chief administrator of vocational and technical education in each of the 50 states provided primary data. The mail survey yielded a 96.0 per cent return. Seven institutions which provided a comprehensive example of the institutions offering post high school vocational and technical education in nine upper mid-western states were utilized to provide secondary data. The researcher conducted a personal interview with the administrator of each of the institutions to secure the secondary data.

The primary data revealed that several methods were utilized to finance capital improvement and general operating expenditures. However, it is doubted to construct any standard financing pattern within the 50 states of the United States. The secondary data revealed various student tuition and fee structures. It also revealed that student services, student activities and laboratory or shop projects were conducted on a self supporting financial basis when feasible.

The primary and secondary data were utilized to identify emerging models for financing area vocational and technical education schools. Four financing models were identified and presented within the study.

Order No. 72-6851, 190 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author VANDERWALL, ALLEN, RICHARD
(Last name) (First name) (Middle name)

Exact Title Implications of Financial Need for Vocational Development

Degree granted Ph D, Date 1971 No. of pages in report

Granted by University of Iowa, Iowa City, Iowa
(Name of institution) (City, State)

Where Available: Microfile (x) Microfiche ( ) E.R.I.C. ( )
University Microfilms, Ann Arbor, Michigan

Purpose of Study:

Source of data and method of study:

Findings and Conclusions:

Please summarize on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Vincent, Jr. (Last name), Walter (First name), Clyde (Middle name)

Exact Title VOCATIONAL EDUCATION OPPORTUNITIES AVALABLE IN THE TEXAS AREA VOCATIONAL HIGH SCHOOLS DURING 1969-70

Degree granted Ed.D., Date 1972 No. of pages in report 184

Granted by Baylor University (Name of institution.) Houston, Texas (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to determine the vocational education opportunities available in area vocational high schools during the school year 1969-70.

Data were collected by interview and questionnaire. The 79 vocational supervisors in the area vocational high schools of the state comprised the population for the study. Five supervisors were interviewed, and 74 were contacted by questionnaire. Three of the 74 contacted by questionnaire reported that their school had not opened. This left 76 schools eligible for participation in the study. A total of 45 responses were received. This represented a return of 59 per cent.

All vocational supervisors held an undergraduate degree and more than 80 per cent had earned a graduate degree. More than 50 per cent had experience as a classroom teacher prior to becoming a vocational supervisor. The annual salary of the vocational supervisor was from $9,500 to $17,999, with 46.9 per cent of the group in the $12,000-$13,999 bracket.

Area vocational high schools were found in all types of communities in the state, as well as in population areas, ranging from below 10,000 to more than a million.

All area vocational schools were relatively new in service. The largest group, representing 51.1 per cent of the respondents, were from 4 to 6 years old. Only 6.6 per cent were in the 7-9 year bracket which indicates the existence of the vocational education movement.

The area vocational schools reported 10,506 boys and 20,049 girls enrolled in 59 vocational technical courses. The courses with the highest enrollments were the following: Typing I, Homemaking III and IV, Agriculture III, and Auto Mechanics.

The evaluation of the vocational program was based first on questionnaires related to the follow-up studies on graduates. The second approach to program evaluation was based on the standards suggested by the Program's Panel of Consultants on Vocational Education, using the following five-point scale:

Excellent	5
Very Good	4
Good	3
Fair	2
Poor	1

The standards were applied to the program areas of Administration, Staff, Curriculum, Guidance, Physical Plant, and Public Relations. The average rating for area schools' vocational program was 3.81. The average rating of each standard in each of the six areas were:

Administration		
Standard 1	(Philosophy)	3.80
Standard 2	(Awareness of Need)	3.77
Staff		
Standard 3	(Professional Competency)	4.20
Standard 4	(Philosophy)	4.20
Curriculum		
Standard 5	(Design)	3.90
Standard 6	(Provides for Experience)	4.04
Guidance		
Standard 7	(Vocational Guidance)	3.51
Standard 8	(Placement and Follow-Up)	3.60
Physical Plant		
Standard 9	(Design)	2.96
Public Relations		
Standard 10	(Functional Relationships)	3.88

Order No. 72-22,905, 184 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Maisner (Last name), Gary (First name), Lee (Middle name)

Exact Title TRANSFER IN AN INDUSTRIAL ARTS PSYCHOMOTOR TASK AS A FUNCTION OF PRACTICE TIME AND TASK COMPLEXITY

Degree granted Ph.D., Date 1970 No. of pages in report 105

Granted by University of Missouri -- Columbia, (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE: It was the intent of this study to compare the amount of transfer from three learning tasks (ranging in complexity from easy to difficult) to a transfer task (of moderate complexity) and to ascertain the effect of different amounts of practice on transfer.

METHOD OF RESEARCH: From the 165 seventh grade industrial arts students enrolled at West Junior High School, Columbia Public Schools, Columbia, Missouri, 90 were randomly selected for use in the study. A sawing operation was presented to the students through the use of a slide-tape program. A transfer task was common to all subjects and was judged to be of moderate difficulty. The learning tasks were varied in complexity from easy to moderate to difficult while the amount of practice on the learning task was: no practice, one trial, and four trials.

Two measures were obtained of each student's performance, one of time and the other quality. A completion time score was recorded by the investigator as the student performed the psychomotor task. The quality score was obtained by the application of an objective scale to the product by three judges.

FINDINGS AND CONCLUSIONS: Statistical tests at the .05 level of significance resulted in not rejecting the null hypotheses of no significant difference in group mean scores for each of the following: (1) amount of transfer due to the initial level of complexity in the learning task as expressed by either completion time or quality of product, (2) amount of transfer due to the different amounts of practice time as expressed by quality of product, (3) amount of transfer due to the interaction of practice time and task complexity as expressed by either completion time or quality of product, (4) learning task performance at different amounts of practice as expressed by either completion time or quality of product, and (5) learning task performance due to the interaction of practice time and task complexity as expressed by either completion time or quality of product.

There was a statistically significant difference in group mean completion scores that represented the amount of transfer due to the different amounts of practice time. Group mean completion times and quality scores that represented the four learning task performances at different levels of complexity were also found to be significantly different.

Identification of a learning task complexity that would contribute to significantly better transfer of learning was not demonstrated by the three task completion employed in the investigation. However, transfer measured by quality of product was not significantly different for groups that had differing amounts of practice on the learning task.

It appears that one learning task performance significantly increased transfer over no practice as expressed by completion time but four performances of the task did not result in any further significant transfer. The interaction between practice time and task complexity had no significant effect on the amount of transfer as expressed by either completion time or quality of product.

Transfer, as measured by completion time for four performances of the "difficult" complexity learning task did not result in a significantly greater amount of time to perform than the four performances of the "easy" or "moderate" complexity learning tasks. Measured by quality of product, the "difficult" complexity learning task was also shown to be the most difficult to obtain a high score.

(Order No. 71-6402, 107 pages

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Waitkus (Last name), Lorin (First name), Victor (Middle name)

Exact Title CONCEPTUALIZING A BODY OF KNOWLEDGE OF SOLID MATERIALS PROCESSING WITH IMPLICATIONS FOR CURRICULUM DEVELOPMENT

Degree granted Ph.D., Date 1971 No. of pages in report 210

Granted by Ohio State University (Name of institution) Columbus, Ohio (City State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

The principal purpose of this study was to develop a rationale and a structure for the teaching of solid materials processing technology. A further purpose was to delineate the implications of this body of knowledge for curriculum development.

Although the study was the development of a body of knowledge of solid materials processing technology, answers were sought to four important questions.

1. What is the underlying reason for studying solid materials processing technology? The body of knowledge of solid materials processing technology is a sub-system of knowledge of industrial technology.

2. What are the materials that may be classified as solids? A development of a "Classification of Solid Materials" constituted an answer to this question.

3. What are the properties that solid materials may possess? A development of a "Classification of Properties of Solid Materials" constituted an answer to this question.

4. Can universal processes be applied to the solid materials? The classification of processes applicable to all materials developed by the Industrial Arts Curriculum Project can be utilized in the processing of solid materials classified in this study.

A classification limited to solid materials and a classification limited to mechanical and non-mechanical properties of solid materials were adopted.

The process of content analysis necessary for the conceptualization of solid materials and properties of solid materials was fulfilled by researching literature, conferring with materials specialists and meeting with teaching personnel. The working papers were based on a synthesis of all the collected data regarding what could comprise an adequate structure of solid materials and their properties. Materials experts reviewed and made suggestions for the refinement of the classifications.

Materials specialists of the Career Development Committee and the Young Members Committee of the American Society for Metals were the expert reviewers who reacted to and reviewed the "Proposed Classification of Solid Materials" and the "Proposed Classification of Properties of Solid Materials."

Solid materials processing technology was derived which constituted a subsystem of a body of knowledge of Industrial Technology developed by the Industrial Arts Curriculum Project at The Ohio State University.

With the development of a body of knowledge of solid materials processing technology, three bases for curriculum development were proposed.

1. The development of "a story of processing solid materials into standard stock."

2. The development of "a story of processing solid materials used in construction and manufacturing."

3. The development of "procedures for efficient practices in processing solid materials."

On the basis of conceptualizing a body of knowledge of solid materials processing with implications for curriculum development, the following conclusions are presented.

1. A "Classification of Solid Materials" provides a basis for the identification of a body of knowledge of solid materials processing technology.

2. A "Classification of Properties of Solid Materials," with mechanical and non-mechanical sub-elements, provides a basis for the identification of a body of knowledge of solid materials processing technology.

3. The classification of processes (forming, separating, and combining) and their sub-elements as developed by the IACP, are applicable to all materials and provides a basis for the identification of a body of knowledge of solid materials processing technology.

4. The structured body of knowledge of materials processing has implications for industrial arts curriculum workers at many levels as well as for curriculum workers in other technical curricula such as engineering.

Order No. 72-11,317, 210 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Waldorf (Last name), Robert (First name), James (Middle name)

Exact Title STUDENT PERCEPTIONS OF FACTORS WHICH INFLUENCE ENROLLMENT IN TRADE AND INDUSTRIAL EDUCATION PROGRAMS IN FAIRFAX COUNTY, VIRGINIA

Degree granted Ed.D., Date 1971 No. of pages in report 235

Granted by The George Washington University (Name of institution), Washington, D.C. (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The purpose of this study was to ascertain, through descriptive research, those factors which influenced male high school students toward enrollment in trade and industrial education programs in the vocational-industrial centers of Fairfax County, Virginia.

The subjects surveyed were the total population of male students enrolled in such programs in the three Fairfax County centers during the month of March, 1971. This population included students from all public high schools in the County. Students from "feeder" schools are bused to the vocational-industrial centers for half days.

The literature concerning reasons for student choice of a vocational education curriculum was reviewed. From this review a survey instrument was developed. The assistant principals in charge of vocational education at the three centers distributed survey instruments, which were filled in and returned by 89.69 per cent of the population.

The major findings were the following:

1. Assignment to a high school which houses a vocational-industrial center encouraged enrollment in programs of trade and industrial education. Conversely, assignment to a high school which does not house a vocational-industrial center inhibited enrollment in such programs.

2. The most frequently identified persons who first suggested enrollment in the programs surveyed were, in order, the high school counselor, the respondent himself, and the boy's father.

3. The persons most influential in final enrollment were perceived as being the respondent himself, the high school counselor, and the boy's father.

4. Outside work experience was the activity which most often led to interest in enrollment in trade and industrial programs.

5. Persons who discouraged enrollment were primarily members of the families of the surveyors. School personnel were not perceived as discouragers of enrollment.

6. A majority of the respondents, 78.48 per cent, reported that they were satisfied with the activities in their programs.

7. The vocational objectives were the most attractive aspects of the respondents' programs.

8. The two major dislikes centered around tools and equipment, and around transportation to and from "feeder" school and vocational-industrial center.

9. A majority of the respondents, 76.13 per cent, indicated they felt that they had no problems as a result of being enrolled in their programs.

10. Suggested improvement centered around tools and equipment.

The findings suggest the following recommendations:

1. Further consideration and study should be devoted to alleviating the problems of transportation to and from "feeder" schools and vocational-industrial centers.

2. An improved system should be devised and implemented for the purpose of acquainting parents and other members of the students' families with all available vocational education programs.

3. Additional efforts should be made to keep all counselors aware of current developments in, and availability of, all vocational education programs. These efforts should include communication between counselors, whose effect upon enrollment in the programs studied was essential.

(Order No. 72-7403, 235 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Walgren (Last name), Floyd (First name), Bronson (Middle name)

Exact Title A COMPARISON OF THE WRITTEN ACHIEVEMENT OF PUPILS IN TWO DISPARATE INDUSTRIAL ARTS SEQUENCES.

Degree granted Ph.D., Date 1971 No. of pages in report 103

Granted by Ohio State University (Name of institution), Columbus, Ohio (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

The majority of the industrial arts programs in the United States are of a traditional nature. In them, the instruction is based upon an analysis of selected industrial trades and jobs.

In recent years, many have questioned the value of such programs. As a result, new curriculum theories of industrial arts have evolved. One of these has been translated into practice through the Industrial Arts Curriculum Project (IACP). Because this innovative junior high school program is being implemented into many schools throughout the United States, comparative research is needed to establish its relative effectiveness.

The purpose of this study was to compare the written achievement of students in two disparate industrial arts sequences. The experimental design employed involved two equated eighth grade groups, one composed of students who had completed a two-year sequence of traditional industrial arts, and the other consisted of students who had completed a two-year sequence of IACP industrial arts. At the completion of their respective two-year sequences, both groups were administered two sets of achievement tests which evaluated the written achievement of each respective program. The means of each groups' scores on each test were statistically adjusted for any differences in IQ scores. The overall means and the means of low, medium, and high IQ groupings were compared between groups.

The findings were:

1. No significant difference existed between the mean scores of each group on the traditional test.
2. A significant difference existed between the mean group scores, in favor of the IACP group on the IACP test.
3. No significant difference existed between the mean scores of each respective IQ subgrouping (high, medium, and low) between each group on the traditional test.
4. A significant difference existed in favor of all IQ subgroupings of the IACP group (high, medium, and low) on the IACP test.

The evidence presented in this study supports the conclusion that individuals who complete the IACP program suffer no disadvantage as compared with those who take two years of traditional industrial arts. Further, the data suggests that the IACP students gain additional knowledge which is not gained by those who complete a traditional program.

Order No. 72-4981, 103 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Wall (Last name), Edward (First name), Rosser (Middle name)

Exact Title A STUDY OF THE TRADE AND INDUSTRIAL PROGRAMS IN VOCATIONAL EDUCATION AT HINDS JUNIOR COLLEGE, RAYMOND, MISSISSIPPI

Degree granted Ed.D., Date 1972 No. of pages in report

Granted by University of Mississippi (Name of institution.) University, Mississippi (City. State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study·

To compile a data base of enrollment data and demographic data of graduates from the trade and industrial programs at Hinds Junior College, Raymond, Mississippi, and gather data that may be used logically and effectively to evaluate the course content for each of the trade and industrial training programs

Source of data and method of study·

The study population consisted of 345 graduates from 13 trade and industrial programs during the 1968-69, 1969-70, and 1970-71 academic years. The primary source for enrollment data were the instructors' monthly reports and the final reports to the Vocational Division of the Mississippi State Department of Education. A questionnaire was used to survey the graduates, Craft Committee members, and the industrial employers concerning program evaluation.

Findings and Conclusions:

1. That the Vocational Department at Hinds Junior College develop and initiate a program of student recruitment which will provide an increased enrollment in all trade and industrial programs.

2. That policies and procedures be developed which will bring about a substantial increase in the retention rate of first year students for the second year of formal training and consequently cause an increased number of graduates in each of the trade and industrial programs.

3. That either modifications be made in existing programs or new programs be developed so that the skills taught in trade and industrial programs will be suitable and inviting to the female population. A concerted effort should be made to recruit female students for the several existing programs which provide training suitable for female enrollment.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & NAITTE

Author Wallace (Last name), Donald (First name), F. (Middle name)

Exact Title THE RELATIONSHIP OF INDUSTRIAL AND ENGINEERING TECHNOLOGISTS IN THE SPECTRUM OF TECHNICAL OCCUPATIONS

Degree granted Ph.D., Date 1972 No. of pages in report 127

Granted by University of Missouri-Columbia, (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study:

To ascertain the relationship between industrial and engineering technologists in forming the internal framework for the technologist's segment in the spectrum of technical occupations.

Source of data and method of study:

Findings and Conclusions:

While some overlap of proliferation of program content and job function seems to exist between the engineering and industrial technologists, the two areas are distinctly different in objectives, the two types of technology should not be combined into a single technologist training program, and the technology curriculums should not provide the same content or train for the same occupational function.

Engineering technology and industrial technology should remain separate and unique programs, not only between themselves, but also respectively from engineering and industrial arts.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN DROPOUT RESEARCH
DROPOUT RESEARCH COMMITTEE - KIRK A. KELLY, CHAIRMAN

Author Ralph (Last name) Raymond (First name) F. (Middle name)

Exact Title RELATIONSHIP OF ENROLLMENT IN PRACTICAL ARTS AND VOCATIONAL COURSES TO THE HOLDING POWER OF THE COMPREHENSIVE HIGH SCHOOL

Degree granted M.S. Date 1965 No. of pages in report 92

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm [ ] Microfiche [ ] O.M.I.C. [ ]

Purpose of Study

To ascertain which factors are relevant to the identification of potential school dropouts and to ascertain the relation of enrollment in practical arts and vocational courses to the dropout rate of those pupils identified as potential dropouts.

Source of data and method of study

The first phase of the study involved establishing criteria for identifying potential school dropouts. The cumulative records of 1960 pupils who were enrolled in the tenth grade of the public high schools in Hartford, Columbia, Hannibal and Kansas, Missouri, during the school year 1961-62, were analyzed. From these data, multiple correlations were computed to arrive at a prediction of high school dropouts. The criteria selected were then applied to the entire original population of pupils to establish a population of 71 potential dropouts. The population of potential dropouts was then expanded to a total of 80 with the inclusion of the tenth grade pupils who were enrolled in the four Springfield, Missouri, public high schools during the school year 1961-62 who met the criteria of potential dropouts. The second phase of the study involved investigation of the potential dropouts' cumulative records from the time each pupil entered the tenth grade until that pupil dropped out of school or was graduated. Data concerning the potential dropouts' enrollment in practical arts and vocational courses were tabulated and analyzed.

Findings and Conclusions:

1. A large portion of the pupils who may be classified as potential dropouts may be identified early in their high school career.

2. A combination of only ten factors, grade point average in the lower quarter of the class and no participation in extra-curricular activities, represents a practical index for identifying potential dropouts.

3. Potential dropouts who enroll in practical arts and vocational courses are more likely to remain in school and graduate than the potential dropouts who do not enroll in these courses.

4. It seems apparent that pupil enrollment in practical arts and vocational courses contributes to the holding power of the comprehensive high school.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Warner (Last name), James (First name), C. (Middle name)

Exact Title EMPLOYMENT OPPORTUNITIES AND TRAINING NEEDS FOR SKILLED WORKERS IN THE STATE OF MISSOURI WITH PROJECTION THROUGH 1970

Degree granted Ed.D., Date 1962 No. of pages in report 178

Granted by University of Missouri-Columbia (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To compare the probable supply of, and demand for, skilled industrial workers in Missouri from 1961 through 1970, and to interpret the implications of these findings for the program of vocational education.

Source of data and method of study:

Data for the study were obtained from published and unpublished reports from the Missouri State Department of Employment Security, State Department of Education, United States Bureau of the Census, United State Department of Labor, Bureau of Labor, Statistics, Bureau of Employment Security and Bureau of Apprenticeship and Training. The projections were based on the trends revealed in these reports.

Findings and Conclusions:

Since the employment of skilled workers as a whole is expected to increase in nearly all of the non-agricultural industries in the State during the coming decade, skilled industrial workers can look forward to a continuing high level of employment.

Unless serious attention is given to the demand for skilled workers by those in charge of training facilities throughout the State, an over supply of trained workers may be expected in the printing trades, tinsmiths, coppersmiths and sheet metal trades, and in the painter, paperhanger and glazier occupational groups.

Despite a general increasing demand for skilled industrial workers in the State, if present trends continue, training facilities for such workers in secondary school may be expected to decline and apprentice registrations may be expected to increase at only about one-third the rate of new skilled employment demands.

Inasmuch as the number of expected employment opportunities for skilled industrial workers is more than twice as great as the number of trained workers that may be expected to enter these occupations during the decade, it is apparent that many skilled worer training programs will need to be expanded or additional ones established.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN EDUCATIONAL MASS COMMUNICATION
JOINT RESEARCH COMMITTEE - NAEB & NSSBE & NAETA

Author Wiersma, William (Last name) Dimmett, Ralph (First name) R. (Middle name)

Short Title An Assessment of Learning Efficiency and Effectiveness Comparing Oriented and Non-Oriented Instructional Television Presentations

Degree granted M.A., Date 1972 No. of pages in report 87

Granted by Rutgers, The State University of New Jersey, New Brunswick, New Jersey
(Name of Institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study

To assess the degree of learning and retention of basic concepts in elementary computing the use of oriented and non-oriented overhead transparencies as visual aids to instruction.

Source of data and method of study:

The sample consisted of 60 S_s randomly assigned to each of two treatment groups. Within each treatment group, S_s were randomly assigned to time subgroups for 1, 3, and 5 minutes of exposure to the treatment variable. Tests for learning were administered immediately after treatment. Tests for retention were administered 2 and 4 weeks after treatment.

The data were analyzed with a two-way analysis of variance and a factorial design.

Findings and Conclusions:

1. The first hypothesis compared whether the use of either oriented or non-oriented transparencies increased the amount of learning that occurred directly after treating. The results for immediate recall (O_1) showed that there was a significant difference between the two treatments. Hence the null hypothesis was rejected.

2. The second hypothesis compared whether there was a difference in post test scores 2 and 4 weeks after treatment and if the difference between the means of the periodic test for retention was significant. The results show that again the treatment group using oriented transparencies was superior not only on tests for initial learning, but for retention tests after 2 and 4 weeks after learning (Table 3: (O_2), F=63.36; (O_3), F=36.39). Hence the null hypothesis was rejected.

3. The third hypothesis examined whether oriented transparencies presented at different times would produce higher mean scores on tests for learning and retention than would non-oriented transparencies presented at the same time exposure. The results show again that the group receiving oriented transparencies, regardless of the amount of time used for exposure to the treatment, was superior to the group receiving the non-oriented transparency treatment. Hence the null hypothesis was rejected.

[redacted]

SOURCE SHEET FOR SUBMITTAL OF STUDIES IN INDUSTRIAL ARTS EDUCATION
ADULT RESIDENCE CONCEPTS - KIND & NATURE & QUALITY

Author: Brickell, Richard, Dean
(Last name) (First name) (Middle name)

Source Title: PROPOSED CONTENT OF A FIELD POWER TECHNOLOGY CURRICULUM FOR HIGH SCHOOL

STUDENTS, AND RECOMMENDATIONS

Degree awarded: Ed.D., Date: 1972 No. of pages in report:

Granted by: University of Tennessee, Knoxville, Tennessee
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) O.M.S.C. ( )

Purposes of Study

1.) To determine a curriculum that will most nearly meet the needs of field power technologists, and 2.) to select the most desirable subject matter content to be included in the various field power courses included within this curriculum.

Source of Data and method of study:

A sample of 40 of the 57 companies that were listed in the advertisement index of the Hydraulics and Pneumatics magazine were willing to participate in the study. Each participating company was assigned a number and a table of random numbers was consulted to form the final sample.

A two-part questionnaire was used to collect the necessary data to develop the four-year curriculum. Part one of the questionnaire was developed by studying the various educational areas pertinents to the field power field into blocks of common courses offered by most colleges or universities. The second part of the questionnaire consisted of blocks of field power topics divided according to purpose or function. The final selection of courses recommended for inclusion in the field power curriculum and the content recommended for the various field power courses was determined by the overall rating which each variable received from the questionnaire.

Findings and Conclusions:

The most valuable business courses for inclusion in a field power technologist program courses marketing, business communications, human relations in business, and industrial management. The industrial Consultants rate a need for a higher level of mathematics than most general education curriculums require. A need was shown by the industrial Consultants for a good grasp of the physical sciences. The topics with the highest ratings in the basic field power block were basic principles of hydraulics, basic principles of pneumatics, and principles of power hydraulics. The consultants rate a need for design and trouble shooting skills as a part of the background of future field power technologists. The most valuable topics for inclusion into field power courses that were listed in the pneumatics block were physical principles, pneumatic directional control valves, and automatic valves.

Based upon the findings of this study, it appears that for future success as a technologist in the field power field the ability to communicate will not be basic ingredient in this occupation.

[redacted]

[illegible]

Thesis by [illegible]
(Last name) (First name) (Middle name)

In partial fulfillment of the requirements for the degree of [illegible]

[illegible]

Degree awarded [illegible], June [illegible] No. of pages in report [illegible]

Accepted by [illegible]
(Name of institution) (City, State)

Thesis available: Microfilm ( ) Microfiche ( ) O.A.I.S. ( )

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GUIDE SHEET FOR SUBMISSION OF STUDIES IN VOCATIONAL ADULT EDUCATION
ADULT EDUCATION CURRICULUM - AUGUST 6, 1973

Author [illegible] [illegible] [illegible]
(Last name) (First name) (Middle name)

Exact Title [illegible]

Degree received [illegible] Date [illegible] No. of pages in report [illegible]

Granted by [illegible] [illegible]
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) O.D.I.E. ( )

Purpose of Study:

Develop guidelines for establishing and running cooperative vocational education in and across the various vocational disciplines for use in Pennsylvania.

Source of Data and method of study:

Worked with the Pennsylvania State Department staff for six months reviewing literature, developing guidelines and synthesizing these with the thinking and philosophy of the directors of the six vocational divisions in the Department of Vocational, Technical, and Continuing Education in Harrisburg. The developed guidelines were used and evaluated by representatives from each of the disciplines from all teaching and administrative levels in the field. The guidelines were revised in light of the evaluation and finalized for publication.

Findings and Conclusions:

The results of the field evaluation strongly indicated that the guidelines are potentially useful to administrators and teacher-coordinators in initiating, maintaining, administering and evaluating cooperative programs in and across the various vocational areas at the secondary level in Pennsylvania. The field test results also indicated that the training agreement is useful, and that the demands are realistic that are placed on the student, parent, employer and the school. It was established that there was much similarity in the cooperation approaches among the various vocational areas.

[redacted]

[illegible]

SOURCE SHEET FOR SUMMARIES OF STUDIES IN DESEGREGATION
JOINT RESEARCH COMMITTEE - NAME & ADDRESS & MAILING

Author [illegible] David S.
(Last name) (First name) (Middle name)

Exact Title FACTORS INFLUENCING NON-WHITE PARTICIPATION IN INTERCOLLEGIATE PROGRAMS
TO SELECTED MIDWESTERN TRADE UNIONS IN NEW JERSEY

Degree received [illegible], Date 1972 No. of pages in report 100

Granted by Rutgers, The State University of New Jersey New Brunswick, New Jersey
(Name of institution) (City State)

Where available: Microfilm (X) Microfiche ( ) U.M.I. ( )

Purpose of Study

To determine how ethnic identity related to the following dimensions of occupational and educational status projections, levels of aspiration and expectation, and certainty of expectation.

Source of data and method of study:

The method employed for conducting this study was to select at random apprentices associated with the electricians, iron workers, plumbers, pipefitters, and theatrical workers trade unions in the Jersey. Data were collected from 70 subjects participating in these unions.

Findings and Conclusions:

There is no significant difference between the attitudes of black and white apprentices toward apprenticeship training.

There is no significant difference between the attitudes of black and white apprentices toward the union.

Racism is not a significant factor which contributes to the severity of discrimination in the building trades union.

There is no significant difference in the procedures followed by black and white apprentices in getting program entry.

The positions to which black and white apprentices aspire, and actually expect to reach, do not differ significantly.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ASIA & ACIATE & MAITTE

Author Wiel, Alexander, F.
(Last name) (First name) (Middle name)

Exact title A STUDY OF THE EMPLOYMENT OF TEXAS INDUSTRIAL ARTS GRADUATES

Series oriented SE-3, Date 1972 No. of pages in report 126

Issued by North Texas State University, Denton, Texas
(Name of institution) (City, State)

Also available: Microfilm (y) Microfiche ( ) E.R.I.C. ( )

Purpose of study

To identify employment status of the 1964-1971 industrial arts majors who graduated from college and universities in Texas.

Scope of data and method of study

Questionnaires were mailed to the 2,098 industrial arts majors who graduated between 1964 and 1971. 1,019 or 48.57 percent returned completed and usable questionnaires.

Findings and Conclusions

1. Graduate major in industrial arts because of personal interest in the field and are satisfied with their choice.
2. Most graduates prefer to remain in Texas
3. Graduates who do not possess teaching certificates tend to find ready employment in industry.
4. Unemployment is not a problem with industrial arts graduates.

[illegible]

Author [illegible] (Last name) [illegible] (First name) [illegible] (Middle name)

Thesis Title [illegible]

Degree submitted [illegible] Date [illegible] No. of pages in manuscript [illegible]

Granted by [illegible] (Name of institution) [illegible] (City, State)

Please Initial(s): Microfilm (yes) Microfilm (no) O.K.A.E. (yes)

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE & MAITTE

Author Wright (Last name), Ronald (First name), Thomas (Middle name)

Exact Title A DESCRIPTION OF THE PATTERNED PROCESSES OF VERBAL INTERACTION THAT CHARACTERIZED SELECTED SEVENTH-GRADE "MARYLAND PLAN" INDUSTRIAL ARTS CLASSROOMS

Degree granted Ed.D., Date 1971 No. of pages in report 228

Granted by University of Maryland (Name of institution), College Park, Maryland (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Statement of the Problem. The problem of the study was to categorize, according to Bellack's system, and to describe the verbal interaction exhibited by teachers and pupils in seventh-grade "Maryland Plan" industrial arts.

The categorizations and descriptions were made in terms of pedagogical moves used, agents making the moves, categories of meaning inherent in the verbal discourse, and the amount of discourse devoted to each pedagogical move and category of meaning. An additional problem was to determine if a change in the pedagogical role of teachers and pupils took place during the observation period.

Statement of Purpose. The purpose of this study was to systematically obtain data concerning classroom discourse in selected seventh-grade "Maryland Plan" industrial arts classes so that the pedagogical roles of teachers and pupils could be identified. Another purpose was to gain insight into the quality, duration and level of verbal interaction in selected classrooms. A third purpose was to establish methods and data against which other industrial arts programs could be analyzed and compared with "Maryland Plan" classes.

Subjects and Procedures. Six seventh-grade "Maryland Plan" classes were selected under the guidance of Dr. Donald Maley, developer of the plan. One class was used for a pilot study and five classes for the main study. One class session was recorded on cassett tapes at the pilot study center to test the recording technique and to provide data for a coder training program. Six class sessions were recorded at each main study site. These sessions were equally spaced over the Spring semester, 1970 "Maryland Plan" unit presented at each center. Each of the thirty tapes was transcribed and typed. Two coders were trained to categorize verbal behavior using the Bellack coding system which had been adapted for industrial arts classes. The coders independently coded a 25-page segment of the pilot study protocol and 25 pages of protocols from the original Bellack study. A percentage of agreement formula was applied to the codings. The main study protocols were coded. One coder coded a protocol, then the second coder reviewed it and marked any questionable codings. All codings under question were discussed by the two coders until agreement was reached. The codings were tabulated for session, class, and by all classes combined.

Findings.

1. Pupils performed slightly more of the pedagogical moves than did the teachers. Teachers performed the majority of the moves during the first sessions and a minority of the moves during the last sessions.

2. Teachers spoke slightly more lines of discourse than did the pupils. Teachers accounted for 80% of the lines during session one and 21% of the lines during session 6.

3. Teachers performed the majority of the soliciting, structuring, and reacting moves. Pupils performed the majority of the responding moves.

4. The majority of classroom discourse was concerned with either "Maryland Plan" units, power and energy, communications and transportation, and tools and machines or construction information.

5. The majority of substantive discourses used empirical processes (fact-stating and explaining) to convey meaning.

6. Instructional meanings accounted for almost one third of all lines spoken. Teachers accounted for almost twice as many instructional lines as did pupils.

7. Fact-stating and statements requesting performance were the most frequent instructional statements.

8. Teachers (1) increased their use of solicitations during the first four sessions then reduced solicitations during the last two sessions, (2) increased the frequency of responding moves over the research period, and (3) reduced frequency of structuring moves over the six sessions.

9. Pupils (1) increased the frequency of solicitations over the research period, (2) reduced the frequency of responding moves during the six sessions, (3) increased the frequency of structuring and reacting moves during the first four sessions then reduced the frequency for both types during the last two sessions.

Order No. 72-12,747, 228 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
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Exact Title An Analysis of the Relationships of Selected Occupational Interests, Aptitudes, and Grade Point Averages of Industrial Arts Education Students in the State of California

Degree granted MED, Date 3-13-72 No. of pages in report 128

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Purpose of Study To investigate and analyze the interests, aptitudes and grade point averages and ascertain relationships that existed between them, if any.

Source of data and method of study Data was gathered from the north, central, and south of California, being restricted to industrial arts education students enrolled in current programs. The Study was a description research, employing the Kuder DD OIS and the Employee Aptitude Survey.

Findings and Conclusions The ranking of occupational interests placed mechanical engineering as most important. The ranking of occupational aptitudes placed visual speed and accuracy as most important. Analysis of the samples revealed the north, central, and south populations were not identical. Statistical analysis revealed no significant relationships existed between interests, aptitudes, and grade point averages. It also showed there was no correlation between the interests, aptitudes and the grade point averages. Conclusions reached indicated population differences across the state prevent generalization when interests and aptitudes are under consideration, therefore, investigations concerning interests and aptitudes, not being related, prevent using one to predict the other. The grade point averages had no bearing on either interests or aptitudes.

*Please summary on this page only.

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Author(s): Jensen, Frank; Ellen

Report Title: Attitudes Toward Vocational Education of Professional Personnel in Secondary Public Schools in Selected Area Vocational-Technical Centers in Florida

Report ordered: 50 ; Date: 1972 ; No. of pages in report: 110

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The purpose of the study was to compare the attitudes toward vocational education of professional personnel in public high schools served by two types of area vocational-technical centers. The two types of area vocational-technical centers were: (1) the separate area vocational-technical center administered by county school boards, and (2) departments of junior college-organized area vocational-technical centers.

The first hypothesis was that no significant differences would be found between the attitudes of professional personnel (teachers, administrators, and counselors) toward vocational education, relative to area provided by the separate area vocational-technical center administered by county school boards, or the department of junior college-organized area vocational-technical center.

The second hypothesis was that no significant differences would emerge between the attitudes of high school teachers, administrators, and counselors toward vocational education.

The third hypothesis was that male and female high school personnel did not differ in their attitudes toward vocational education.

The fourth hypothesis was that teachers in selected high school subject areas did not significantly differ in their attitudes toward vocational education.

The instrument used to measure attitudes consisted of 30 attitude statements which comprised two attitude subscales identified by the use of factor analysis. Response to the attitude statements was assigned weights to aid in assessing how the respondents who were most favorable toward vocational education would receive the highest score.

The sample consisted of 11 public school teachers, administrators, and counselors employed in 9 high school which were served by selected area vocational-technical centers in Florida. Vocational education teachers were not included in the sample.

The hypothesis was tested by the 'F' test of significance by analysis of variance (Anova). The Scheffe Range Test was used to test differences between the mean attitude scores among which significant differences were detected by the analysis of variance.

The study indicated that the attitudes of the respondents were significantly related to their sex or to the type of area vocational-technical center which served the high school. Administrators and counselors were found to be significantly more favorable toward vocational education than were teachers. A significant difference was found among teacher groups according to the subject area in which they were teaching vocational education. In general, all groups of respondents were favorable toward vocational education in the high school and to vocationally bound students.

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